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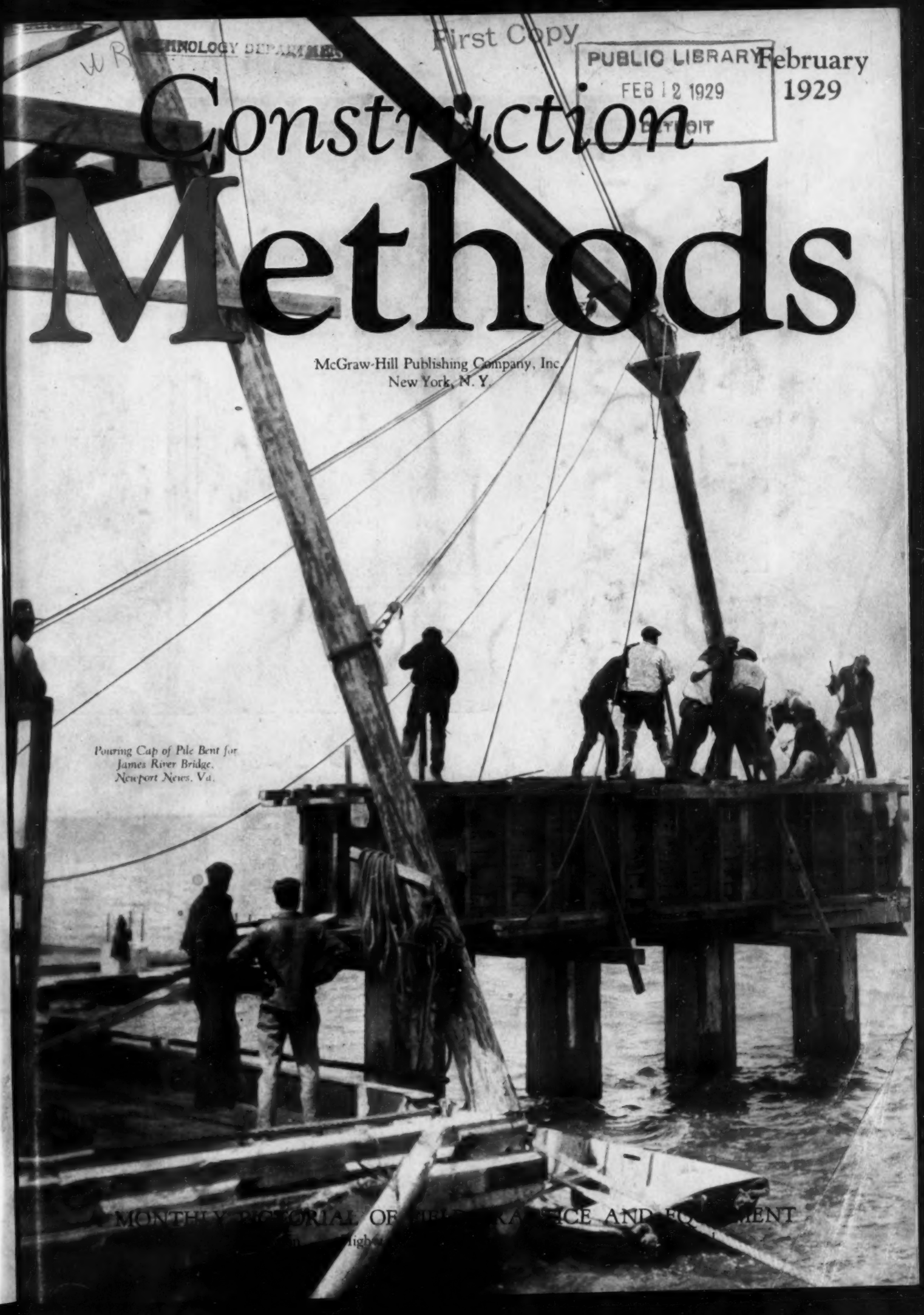
Construction Methods

McGraw-Hill Publishing Company, Inc.
New York, N. Y.



Pouring Cap of Pile Bent for James River Bridge, Newport News, Va.

MONTHLY PICTORIAL OF [illegible] PRACTICE AND EQUIPMENT

I-R Portable Compressor outfits were used during the construction of the new South Shore Bridge over the St. Lawrence. This giant structure, linking Montreal with Longueil, is about two miles in length.

As We Enter 1929~

1928 saw the building and construction industry at its highest peak. The coming year, according to present indications, will exceed anything the past has known in volume of construction work.

1929 again finds Ingersoll-Rand offering improvements in its portable compressor equipment. The use of these outfits is growing steadily with industry; in fact, has contributed much to its success.

Once more Ingersoll-Rand is prepared to cooperate in making the coming twelve months an outstanding year.

INGERSOLL-RAND COMPANY

11 Broadway **New York City**

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TECHNOLOGY DEPT.

Road Building Developments

ALL construction men know that great changes in the methods of highway construction have occurred in the last decade. But how many of them appreciate the rapid advance of the past year or two? The road builder who pauses for a glance backward cannot but be impressed by the improvement in construction equipment and by the ability of the new machines to add quality or cut costs.

When did the shovel with five boom attachments, convertible for a multitude of uses, make its appearance? Diesel-electric and gasoline-electric shovels are still comparatively youthful. Was not the steel wagon with two crawlers under the rear axle considered a great stride forward not long ago? Now the field has received the wagon mounted on four crawlers, hauling twice as much earth as its predecessors. Power-operated bodies which dump to either side and to the rear have simplified the building of fills by truck and trestle. Graders with blades and wheels manipulated through power-driven gears controlled by the operator have made the speed and extent of grading dependent on the power and flexibility of the tractor. Earth spreading operations have been speeded up by tractor-bulldozer outfits.

The asphalt paving field too has experienced most strikingly a variation in the improvement of construction methods by the adopting of standard machines to new purposes. Spreading of bituminous material with concrete finishing machines constitutes one of the most recent advances in the laying of asphalt pavement. Surface mixing of bituminous concrete with ordinary road graders and maintainers apparently has brought the cost of the thoroughly bonded bituminous pavement within the allowance for light and moderate traffic roads.

Concrete road construction was the branch of highway work in which the first great mechanical improvements were made. The progress continues today. Automatic mixer control, water-measuring devices accurate for all positions of the paver, an emulsion for curing concrete slab, a machine for making contraction joints—these are some of the recent advances.

When one turns to a consideration of the sources of mechanical improvement in all phases of highway construction the conclusion is inescapable that the manufacturers are chiefly responsible. Only in the matter of adaptation has the field man blazed the trail—shown the way to the maker of machines. It is natural that the manufacturer should be the one to develop new tools. He has the resources, the plant, and the opportunity to sense the needs of the field and to translate them into new or improved equipment.

The contractor who wants to be declared low bidder occasionally cannot afford to ignore new developments in equipment. Usually machines are created or changed for the dollars-and-cents purpose of lowering costs. The fact that a design seems radical is the worst reason in the world for disregarding it. If a man wants to stay in the construction business, he must keep posted on what the manufacturers are doing. The rapid changes of the past, as illustrated in the impressive exhibit of last month's Road Show in Cleveland, show us what we may expect in the future.

CONSTRUCTION METHODS
A monthly review of modern construction practice and equipment
PUBLISHED BY
McGRAW-HILL PUBLISHING COMPANY, INC.
TENTH AVENUE AT 36TH ST., NEW YORK

SIMPLE ARITHMETIC—In commenting upon the increasing demand for labor-saving machinery in the construction field, a leading equipment distributor made the following observation: "Capital would rather pay a man $12 a day to sit on a machine and dig a trench than pay 20 men $4 a day to do the same work. It is obvious that the laborer would rather learn to run the machine and get $12 than stay in the ditch and get $4."

Equipment Accounting

MANY contractors are puzzled by the problem of how to charge off their equipment. Most of them probably resort to the expedient, considered good accounting practice, of entering depreciation plus carrying charges and maintenance on their books. A simpler plan has been worked out by several companies. It can be recommended for wider use.

All equipment is placed on a rental basis, and a fixed charge is made for each hour a machine is in use. This charge is great enough to pay all operating expenses of the machine plus a reasonable profit. In other words, it is equal to the amount which would have to be paid to another company if the equipment were leased. It includes all carrying charges, depreciation, maintenance, fuel, and lubricants.

This system of charging off equipment greatly simplifies the keeping of cost sheets and gives a fairer indication of whether a job is running at a profit. As the rental price includes insurance, the job profits do not suffer so much when accidents to plant occur. Neither does a loss on the job books always mean an actual loss to the contractor. The equipment may have earned a profit greater than the loss sustained by the job. In this case, the contractor, since he is renting the plant to himself, can cover his job loss with his equipment profit. The fact that he lost on the job, while paying a fair rental for plant, indicates that the bid price was too low.

TIME SCHEDULING—"Owners are not particularly interested in collecting penalties, but in obtaining their projects when expected. If the various operations are not "time scheduled" in advance and constantly synchronized on the job, delay is inevitable."—*Ward P. Christie of the Associated General Contractors.*

Just One Big Coupon

"THE advertising pages of that paper are just one big coupon attached to the reading pages." He was talking about *Construction Methods.*

So naturally I asked him, "What do you mean, 'coupon'?"

"Well," he continued, "there's a paper that's all about methods of doing construction work. Every month it's full of pictures and articles on how they're doing all kinds of jobs all over the country. It's a liberal education in the latest methods for doing almost any job better and quicker and cheaper.

"Now you know as well as I do that most of those methods are pretty much a matter of plant—equipment and tools. Often materials, too. And when you want to use one of those ideas or do something like it you've got to get the dope on the plant or materials. And the advertising pages are full of nothing else but.

"That's what I mean about the coupon. You see how it's done in the articles; then the advertising pages put you next to the stuff you need to do it with."

Now there's the idea, pretty much as it came to me; and I am passing it on for whatever it may be worth. It's an interesting thought. I wonder if all the readers of *Construction Methods* are getting full value out of the advertising pages as a "coupon" to the reading pages.

Willard Chevalier
Publishing Director

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CHANGE OF ADDRESS
Subscribers are requested to send both the old address and the new address when they move to a new address.

Member—Audit Bureau of Circulations.
Member—Associated Business Papers.

"That *Extra* ¼ yd."

is profit insurance that cannot be purchased like life insurance. There'll be plenty of times when you'll be glad you bought a 1¼ yd. Byers shovel. On many an emergency job or extra tough one, the additional ¼ yd. capacity determines the profit.

On ordinary daily work the 1¼ yd. Byers gets greater yardage, of course, and without the extra maintenance and depreciation cost due to over-loading a smaller shovel. The extra ¼ yd. is profit insurance for you.

New Catalog just out. Send for it.

THE BYERS MACHINE CO., Ravenna, Ohio

Sales and Service Throughout the Country

BYERS

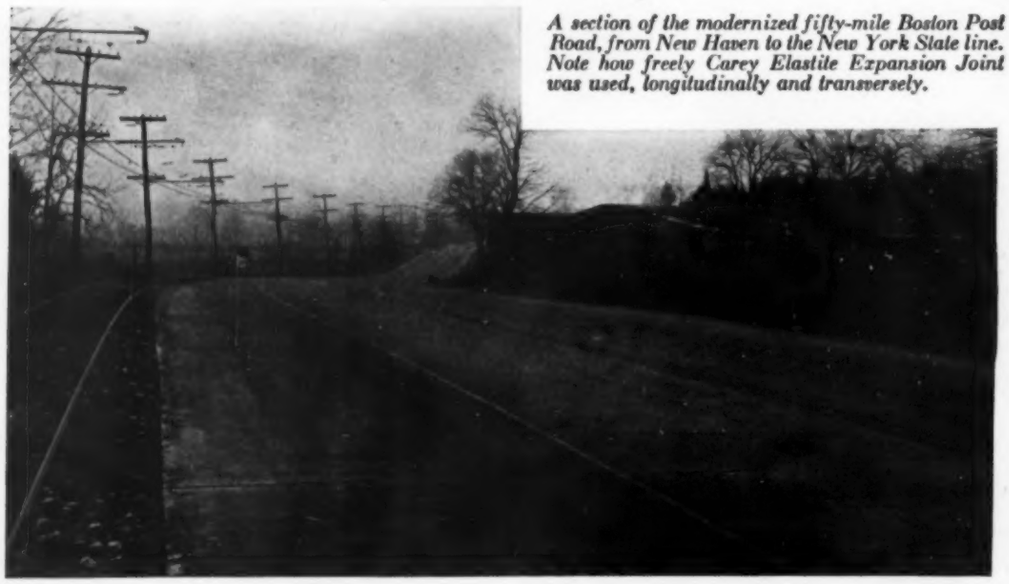
RAVENNA-OHIO

Here's How

Faster swing speed and faster line speeds help Byers to dig more dirt per day. The crowd-shaking dipper reduces dumping time. 107 H. P. motor and direct drive to drums insure power supply.

BYERS

FIFTY MILES OF
boulevard-smoothness . . .
FIFTY MILES OF
wrinkle-proofed concrete . . .



A section of the modernized fifty-mile Boston Post Road, from New Haven to the New York State line. Note how freely Carey Elastite Expansion Joint was used, longitudinally and transversely.

—*the famous old Boston Post Road*

THREE years ago, when the historical old Boston Post Road was paved with concrete, the construction engineers built into it the long-lasting protection of Carey Elastite Expansion Joint. Three longitudinal joints—transverse joints at 40-foot intervals.

Fifty miles of boulevard smoothness—fifty miles of wrinkle-proof concrete . . . the *new* Boston Post Road! Protection against expansion and contraction over-stresses — protection against the threats of weather . . . Carey Elastite Expansion Joint!

Carey Elastite Expansion Joint is made of fibrous asphalt, permanently pressured between two layers of asphalt-saturated felt. It is used in practically every State in the Union. It reduces maintenance expense and adds but a trifle to the cost of construction. Write for your copy of our free booklet—it will give you the facts of modern Expansion Joint installation.

Carey Elastite EXPANSION JOINT

THE PHILIP CAREY COMPANY, *Lockland*, CINCINNATI, OHIO

W. J. Newman Co.
Chicago, Ill.

15% to 20%
GREATER PRODUCTION
with
NORTHWEST
VARIABLE SPEED MOTOR
accelerator controlled

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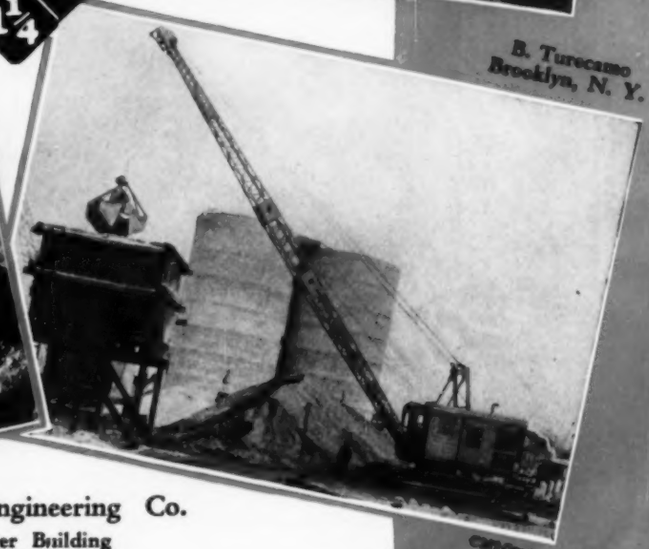

Northwest Engineering Co.
1725 Steger Building
CHICAGO, ILL.

THESE JOBS HAVE PROVEN IT

CLYDE HOISTS-DERRICKS

Clyde 2-drum gasoline hoist used by the Miller Building Co., on the construction of the 10 story "Casa Loma" apartment building in Kansas City, Mo. This is a typical Clyde installation with the hoist doing double duty, handling both the concrete bucket and the wheelbarrow cage with ease and efficiency.

You'll take Pride—
In your Clyde

CLYDE IRON WORKS SALES CO.

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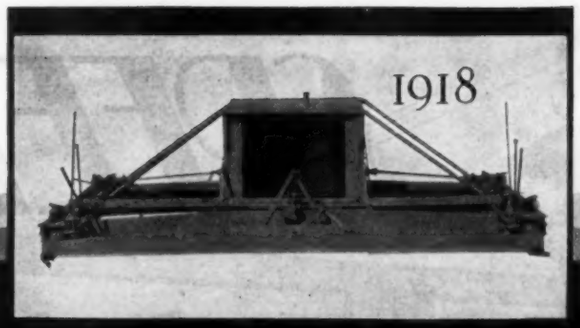
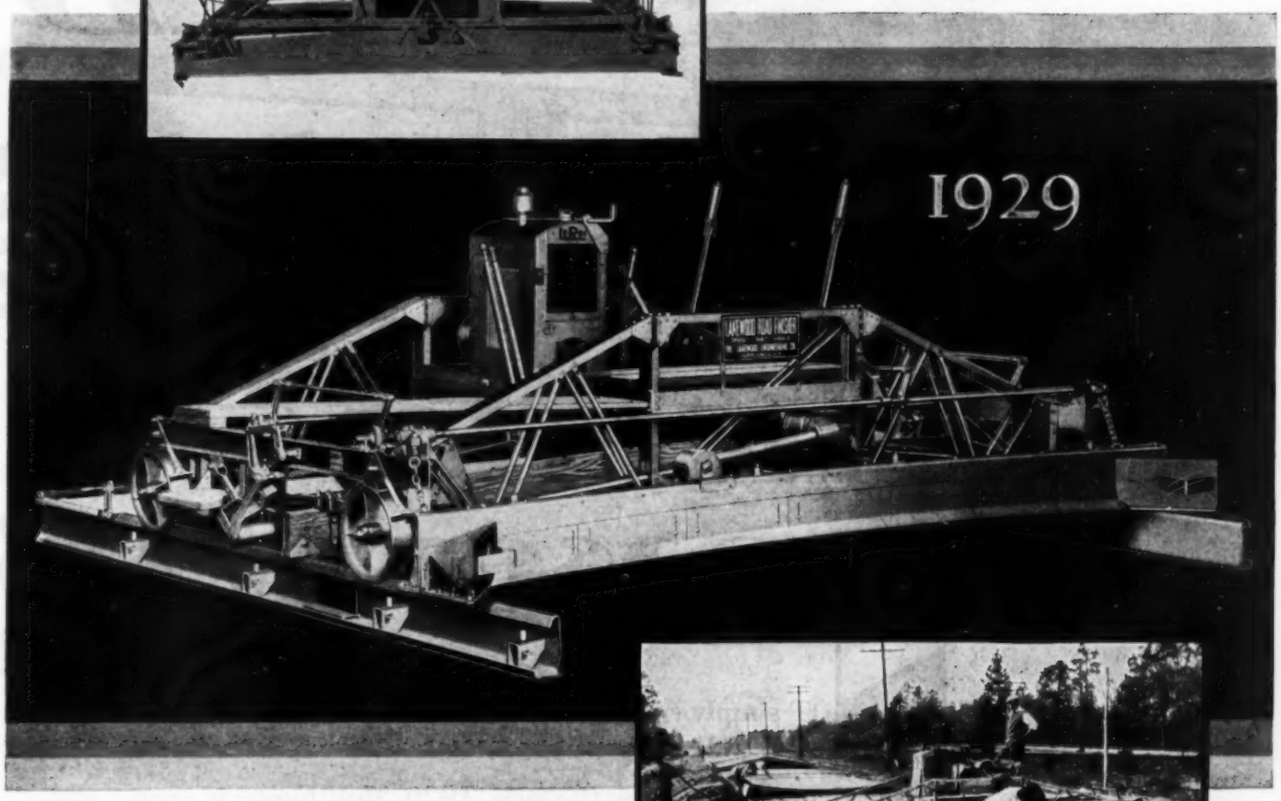
SUCCESSFUL PERFORMANCE FOR AGC-A-ZMC





It wasn't so long ago

THAT the Lakewood Screed, shown at the upper corner of this page, revolutionized the method of finishing concrete roads. The 1929 Lakewood Type "C" Screed will screed and finish four or five times as much concrete in a single day as this original machine, and the surface will be far smoother than that which was considered "good pavement" a few years ago.

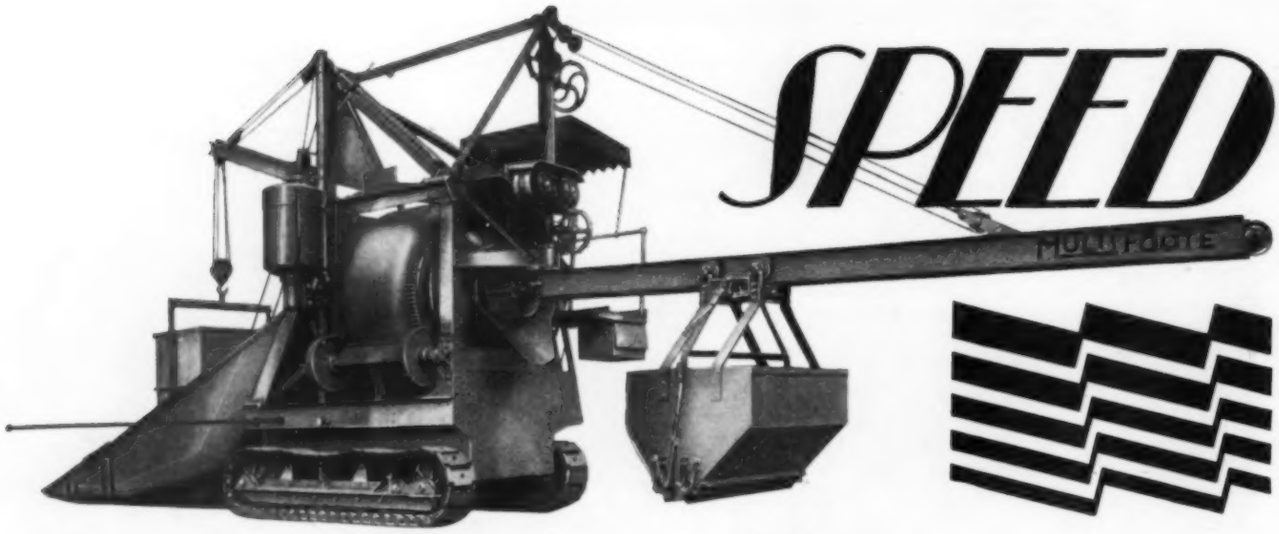
The automotive type of construction and the tiltable screed member together with the many other up-to-date features of the new Lakewood Type "C", have placed it as one of the outstanding engineering features of the present road building age.

Bulletin 47-R tells the story. Send for a copy now.

EXPORT OFFICES: 30 Church St., New York City - - *CABLE ADDRESS:* Brosites

LAKEWOOD

The Lakewood Engineering Co., CLEVELAND - O.



SPEED

day after day all season long

NOT simply speed for a spurt but speed for the long, long pull as well.

Faster than ever before the new 1929 MultiFoote is even more reliable. Day after day you can count on it to grind out record yardages and steady footage. That is what makes profits at the season's end.

The 1929 improvements on the MultiFoote have cut the last wasted second from the operating cycle. Every feature of automatic operation that is practical has been tested out and installed. There are no "bugs" to be worked out in the field; no experiments to be made at the contractor's expense. It is a tried and tested paver, refined down to the last degree and backed by three seasons of record breaking performance.

THE FOOTE COMPANY, INC.

of Nunda, N. Y.

WORLD'S LARGEST EXCLUSIVE BUILDERS OF ROAD PAVERS

MULTIFOOTE
The Paver with Timken Bearings

Frank E. Hall
152 W. 42nd Street New York City

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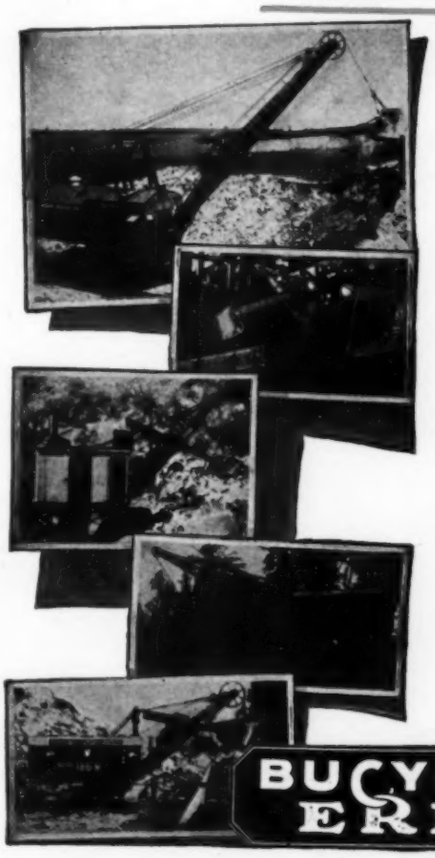
MultiFoote Sales Company
2811 West Fulton Street Chicago, Ill.

Guaranteeing better value in the machine you buy—

over 10,000 BUCYRUS-ERIES

now in service—nearly twice as many machines as nearest competitor has produced—three to six times as many as other manufacturers



IT PAYS YOU to buy the shovel or crane, dragline or dredge, that has this unequalled experience built into it—

A machine that has been fully developed down to the last detail, by the contributions of more than 10,000 excavating machines that have gone before.

When you buy a machine with such a pedigree, its Reliability in hard service is just as much of a certainty as its evident Better Value, and Higher Operating Efficiency.

BUCYRUS-ERIE COMPANY

Plants: South Milwaukee, Wis. — Erie, Pa. — Evansville, Ind.
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The world's largest builder of excavating machinery

Ransome

3 JUMPS AHEAD in STEEL TOWERS

#1 of the Series

The Ransome Heavy Steel Tower is and always has been the *only* steel tower built strong enough to carry a boom plant with a 48 ft. counterweight chute having its inner end tied down and carrying at its unsupported outer end a 48 ft. swivel head chute.

You pay no more for a Ransome Tower—so why not have this convenience and money saver—three 48 ft. chutes entirely supported by the tower except the outer end of the last one?

Ransome Heavy Steel Tower, Ransome 14-S and 7-S Standing Building Mixers used on McComas St. Warehouse, Baltimore, Md., by P. C. Streett Engineering Co., Baltimore, Md. This firm has completed $10,000,000 worth of work in Baltimore in the last four years using Ransome equipment exclusively

Two other features are *found only* in Ransome Towers.

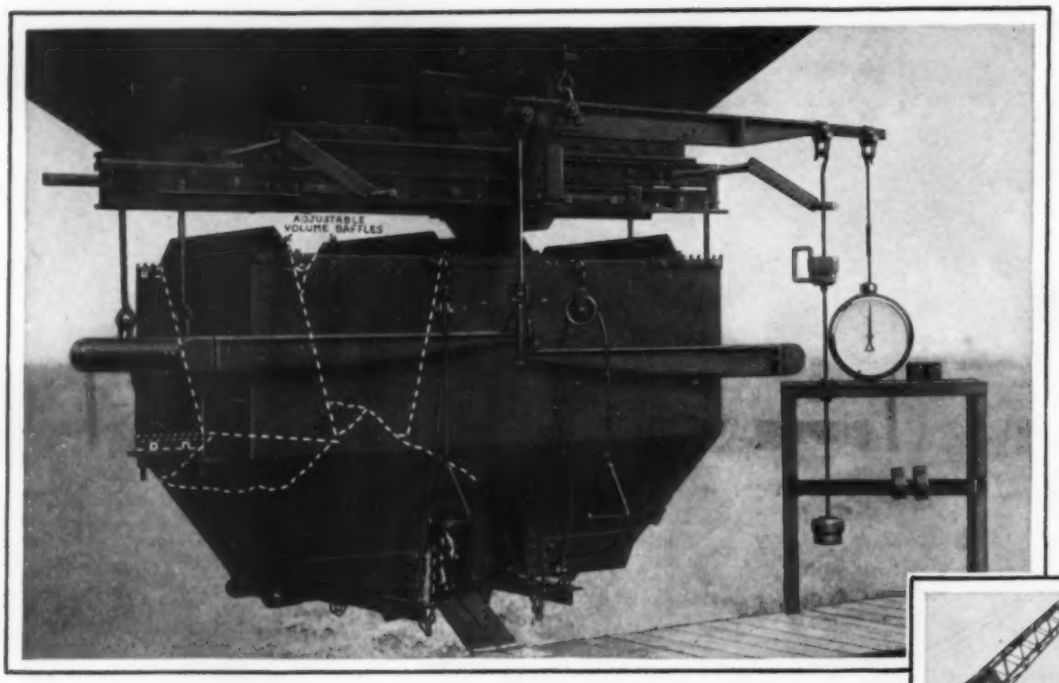
Send for Bul. 203

Ransome Concrete Machinery Company

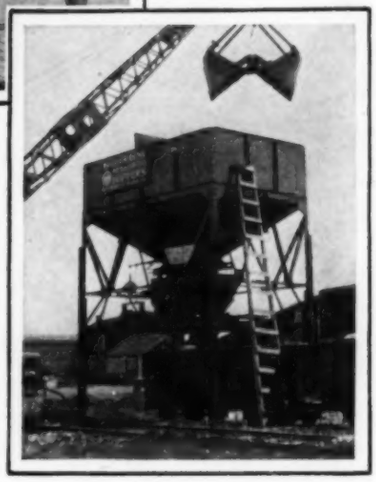
1850 — Service for 79 Years — 1929

Dunellen **New Jersey**

OWEN
"A Mouthful at Every Bite"
—and what a mouthful! . . . . . The Owen Type "S" (shown here) is a bucket of exceptional length and width and a huge, expansive mouth . . . strongly reinforced throughout . . . particularly efficient for material handling.
It cleans up a bigger job in less time —that's why with the Type "S"— as with every other Owen Bucket— you can write your own guarantee.
Send for the new "S" Folder, or for a catalog explaining the entire line of Owen Buckets.
THE OWEN BUCKET COMPANY
6023 Breakwater Avenue
Cleveland, Ohio
Owen Buckets



Butler All-Steel Scales are approved by the highway departments in states specifying proportioning by weight.



Butler *All-Steel* Scale

PROPORTIONING by weight is the certain method of obtaining an exact ratio of aggregates, cement and water. It not only compensates for the moisture content of the material but it is the only method that gets correct proportions, however much the voids in the material may vary.

——and the Butler All-Steel Scale gives correct weight quickly and dependably. All operating levers are banked for one-man control—their operation is easy and positive. There's no overweight because of sticking gates or a balky scale.

But the most important feature of the Butler Scale is its All-Steel construction. *There is not a cast part anywhere.* A sharp accidental rap on a frosty morning that would put a cast scale out of commission does not affect the steel members of the Butler Scale. There's no hold-up on the job while new parts are supplied from a distant factory.

The Butler All-Steel is on the job always — without interruptions or loss of time. Study the Butler Scale before you buy proportioning equipment. Write for our Bulletin No. 150A.

BUTLER BIN COMPANY, *Waukesha, Wisconsin*

Representatives in *fifty principal cities.*

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***Steel* BINS**

"HERCULES"
RED-STRAND
REG. U.S. PAT. OFF.
WIRE ROPE
IF YOU are not entirely satisfied with your wire rope results; if you want to minimize the time your equipment is idle due to rope changes; if you want maximum wire rope service for each dollar that you spend—we would like you to give "HERCULES" a chance to show you what it can do.
Made in both Round Strand and Patent Flattened Strand Constructions in order to meet all working conditions. Your inquiries would be appreciated.
Made Only by
A. Leschen & Sons Rope Co.
5909 Kennerly Avenue
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Digs and Dumps Higher

THE Universal-35 Center Drive Shovel boom digs and dumps higher than any other ½ yd. shovel in the world using the same length of boom and dipper stick.

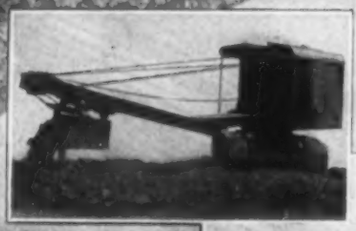
In the Center Drive Shovel boom the shipper shaft is placed in the center of the boom, a position which enables obtaining greater operating ranges. Crowding is done by a powerful, direct rope crowd, self adjusting to all boom angles. The Shovel boom is quickly interchangeable with Crane, Skimmer and Backdigger booms without making changes on the superstructure back of the boom hinge pin.

The mounting for the Universal-35, with its improved Universal superstructure and its new Center Drive Shovel boom, is a 2 speed Center Drive Crawler that outmaneuvers all others.

Measured by any standard, Quality Construction, Advanced Design, Performance or Price, the Universal-35 is "The Greatest Value in a ½ yard Machine."

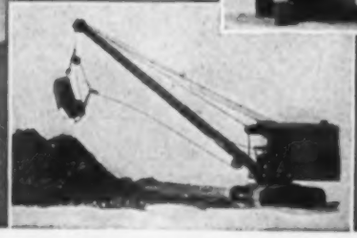
The reason the Center Drive Shovel digs and dumps higher is told in Bulletin 45-L. Write for a copy today.

THE UNIVERSAL CRANE COMPANY
1336 E. 28th Street *Lorain, Ohio*



SKIMMER SCOOP

DRAGLINE

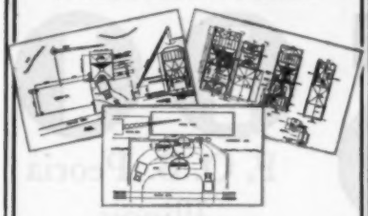


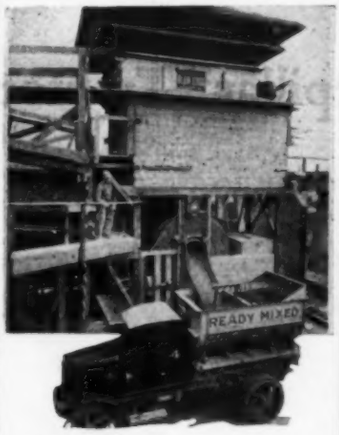
BACKDIGGER

UNIVERSAL-35

a Complete Service

from Start to Finish





The Blaw-Knox Company is now prepared to furnish complete service for the production of ready mixed concrete and its transportation to point of use without segregation

Plant Layout · Steel Bins
Measuring Equipment

Blaw-Knox Engineers will study your requirements and submit to you without obligation, a complete design for plant layout — including bulk cement and lime storage and handling equipment.

Choice or combination of three distinct types of measuring equipment (Volume, Weight, or Inundation) meet every central mixing plant requirement for the economical production of quality concrete.

for Ready Mixed Concrete

The BLAW-KNOX Agitator Truck Body

prevents segregation of mixed concrete in transit

The BLAW-KNOX AGITATOR TRUCK BODY completes Blaw-Knox Central Mixing Plant Service. This Truck Body effectively solves all problems of haulage and delivery of wet and dry concrete.

- *—It prevents segregation.*
- *—it delivers more workable concrete.*
- *—it can be mounted on any chassis.*
- *—it is mechanically right.*
- *—it can also be used for hauling sand, stone, coal, etc.*
- *—it has been proved by fourteen months of actual operation at one of the most modern Ready Mixed Concrete Plants in the United States.*

The complete details of this remarkable equipment are contained in Catalog No. 1083—"The Blaw-Knox Agitator Truck Body."

FREE *facts and figures* **INVALUABLE** *if you are interested in the Ready Mixed Concrete Industry*

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We would like to have your publication "Facts and Figures about the Ready Mixed Concrete Industry." . ☐

Form No. 1083—"Blaw-Knox Agitator Bodies." . . ☐

Form No. 1087—"Six Ways to Get into the Ready Mixed Field." ☐

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BLAW-KNOX

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Illinois

The price of the new Model Ten "Caterpillar" Tractor

Little brother to the big "Caterpillar," a sturdy new track-type tractor in a smaller size! Balanced power and traction...a 14 h.p. engine delivering 10 h.p. at the drawbar... destined to bring "Caterpillar" fame to thousands of smaller farms and to new users in industry!

With a track that bridges soft going (and without packing) with all "Caterpillar" qualities of ruggedness and dependability.

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"Caterpillar" Tractors

CATERPILLAR
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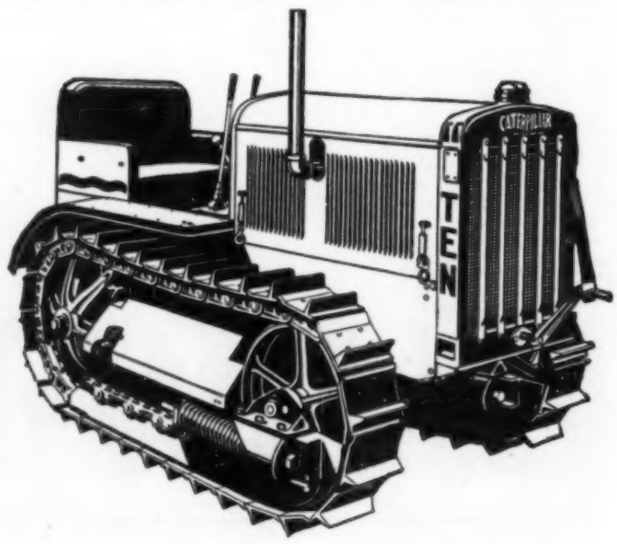
TRACTOR

THE NEW MODEL TEN



2 purpose pump

self priming

75 lbs.

¶75 lbs...weight of complete pump with built in air cooled gasoline engine. Portable by one hand.

¶Also furnished with electric motor drive.

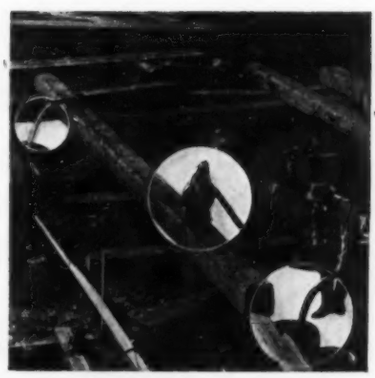
¶Capacity one gal. per hr. or up to 6000 gal. per hr.

For Seepage →

← For Volume

Distributors throughout the world for demonstration and service.

HOMELITE CORPORATION
Port Chester, New York



6000 gal. per hr.

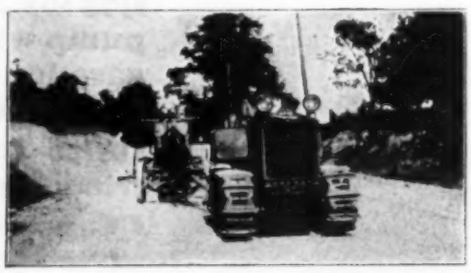
Homelite

3201

Cletrac

A Complete Line of Crawler Tractors for Every Power Need!

THE extraordinary records of performance established by Cletrac Crawler Tractors in road and contracting work command the attention of every tractor user. The miles of highways they have built—the maintenance work they are carrying on for Highway Departments all over the world—the huge loads they are hauling in scores of industries — the infinitely varied tasks they are handling successfully for thousands of owners—all of these factors are evidence of a utility far beyond the scope of ordinary tractors.



HERE is a new book — *just off the press* — which tells the Cletrac story in a big and helpful way. Thirty-two pages with more than one hundred illustrations show the work these better power units are doing in the different phases of road, industrial and contracting service. It is *free* and will be mailed you promptly on request. Mail the coupon or write.

The Cleveland
Cleveland

LOOK them over — these notable tractors that thousands have learned to call "the biggest values in the tractor power field." Here is power — in different size units to meet all working needs. Power that travels *surely* — over sand and gravel — mud and swamp — ice and snow. Power that is *there* — for the big loads and the hurry-up schedules. Whatever the power job, there's a Cletrac and a Cletrac hook-up to handle it efficiently, economically and profitably.

Find Out NOW-about CLETRAC

You've watched with growing interest the steady trend toward *crawler* tractors. More than likely you have wondered many times just what these powerful easily-handled, positive-traction units could do for you.

Why not find out — *today?* Learn what other men with power problems similar to yours are making and saving — with CLETRACS. Whether you are interested as a highway or street official — whether you are a contractor directly or only indirectly interested in dependable tractor power for any type of service, let us send you full information. No obligation, of course.

Simply mail the coupon — or, write us in detail regarding your particular power needs. In either case your request for information will be handled quickly and thoroughly.

THE CLEVELAND TRACTOR CO.,
10323 Euclid Avenue, Cleveland, Ohio.
I am especially interested in Cletrac for (type of work)_____
Please send literature.
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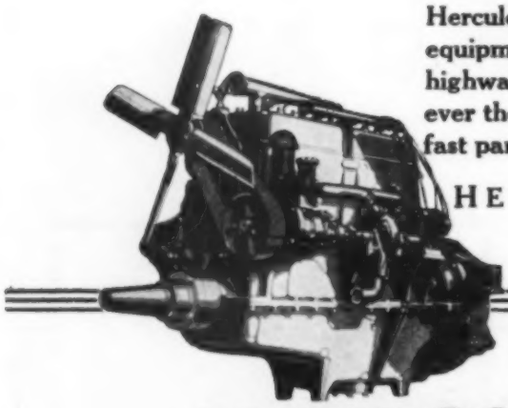
Tractor Co.
Ohio, U.S.A.

Lifting a City's Blockade of Snow

EATING through mounds of packed snow and ice, a fleet of Nelson Snow Loaders equipped with Hercules Engines clears the winter-blockaded streets of New York City. Before traffic is seriously delayed—often while the city sleeps—literally tons upon tons of snow are loaded into trucks and carted away with efficiency and dispatch.

Time and again, the Hercules Engines in Nelson Equipment have provided the brute-force and stamina quickly to accomplish this hard job. Working usually under the worst of weather conditions, they have given reliable, economical service.

Hercules heavy-duty Power Units and Engines are standard equipment on many types of road maintenance equipment and highway constructing machinery. Whatever the purpose, wherever the scene of operation, Hercules power is a sturdy, steadfast partner in all work.

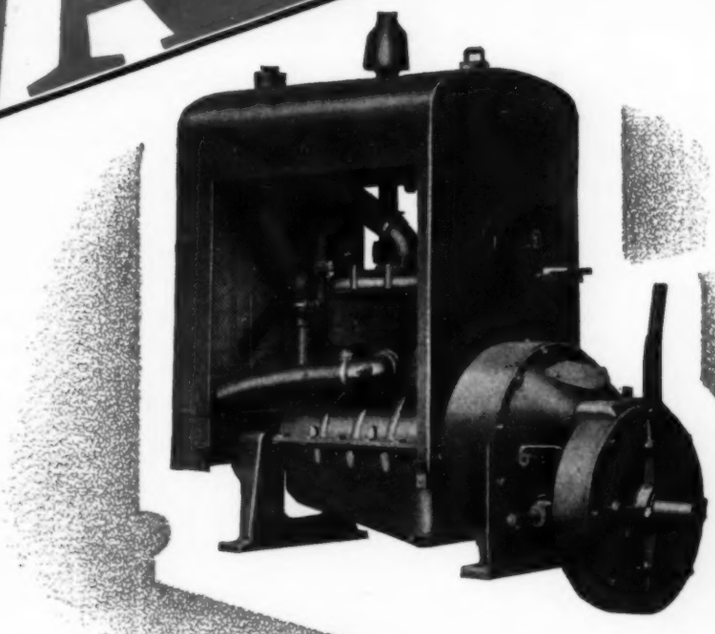


HERCULES MOTORS CORPORATION
CANTON, OHIO, U. S. A.
West Coast Branch: Los Angeles, Cal.

HERCULES ENGINES

VALUE . . . your money's worth! It creeps into every sale and purchase. Particularly on construction equipment—for you get no more from a machine then that which *it has!* . . . Consequently—consider carefully the *power!* Make the Le Roi your standard of comparison. Consider design and construction—consider its field performance. Then you will learn of its dependability—its ability to stay active longer—its low cost of operation . . . Insist on the Le Roi—it is unquestionably the engine of true . . .

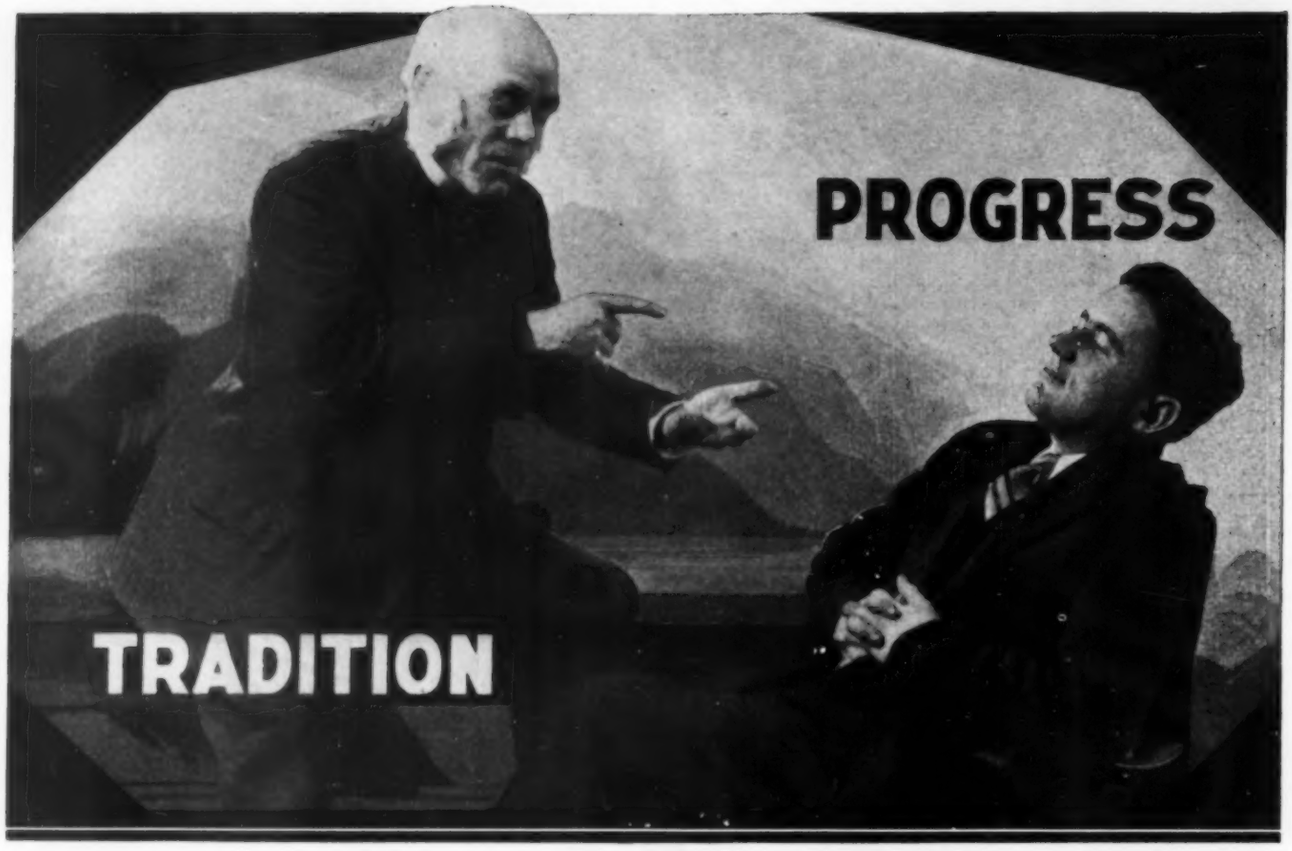
VALUE



LE ROI COMPANY, MILWAUKEE, WISCONSIN

LE ROI ENGINES

3 to 170 HORSE POWER



"Here, Lad—

You've been telling me that the Lincoln people were FIRST to build an arc welder, FIRST to apply arc welding to buildings, bridges, etc.

Now here I read the ad of another company saying they were responsible for the advent of arc welding.

Now, *both* can't be right."

"Sure, Pop—

every man who had an eye on or a hand in arc welding in the pioneering days—now says 'I told you so' and that makes him a pioneer.

What I told you about Lincoln FIRSTS are facts of record, but that's relatively unimportant.
The important point is

— by reason of Lincoln's longer interest in the subject

— by reason of that interest being more intense (arc welders being their specialty)

— by reason of Lincoln's wide-spread development work with manufacturers in hundreds of fields

a much better machine has been built than could have been the case with lesser qualifications.

That's why I won't argue about pioneering.

I'd be glad to class everyone immediately following Lincoln as a pioneer even if he only attracted attention to arc welding and in this sense I'd even class Doc Cook as a polar pioneer."

The Lincoln "Stable-Arc" Welder

— welds easier
— makes better welds
— permits greater output

because of the steady uniform arc throughout entire welding range, which is the result of:

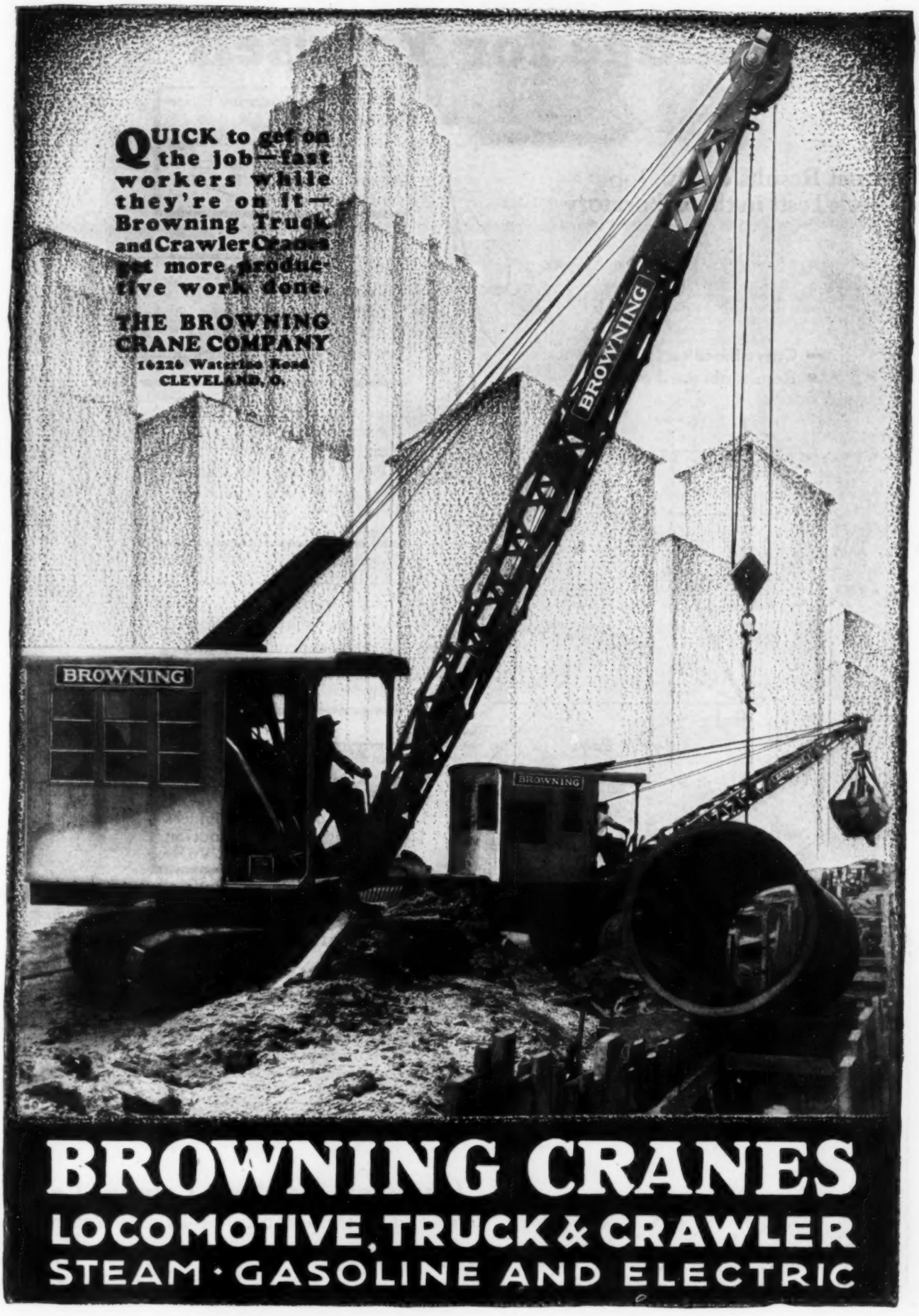
Variable voltage design
Laminated magnetic circuit
Separately-excited generator field
Double control of welding heat
All steel construction

No other welder has all these features.

The Lincoln Electric Co.
Dept. No. 32-2, Cleveland, O.

W-75

LINCOLN "Stable-Arc" WELDER


QUICK to get on the job—fast workers while they're on it—Browning Truck and Crawler Cranes get more productive work done.
THE BROWNING CRANE COMPANY
16226 Waterloo Road
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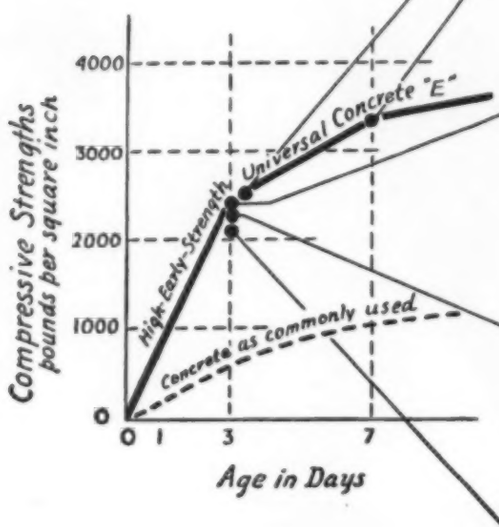
LOCOMOTIVE, TRUCK & CRAWLER
STEAM · GASOLINE AND ELECTRIC

Judge for Yourself

Actual Results on the Job Check Tests in the Laboratory



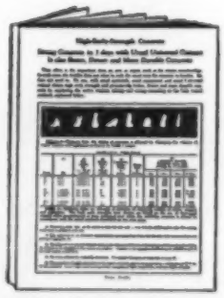
Heavy-Duty Foundry Floor
Du Bois, Pa.
2494 lb. concrete in 3¼ days
Average of 3 test cylinders
Alfred Johnson, Du Bois, Pa., contractor

Manholes for Conduit
Chicago (Commonwealth Edison Co.)
3303 lb. concrete in 7 days
Average of 4 test cylinders
Bates and Rogers Construction Co., Chicago-Cleveland

Pavement
Lesure Street, Duluth
2350 lb. concrete in 3 days
Average of 6 test cylinders
John Wilson, City Engineer, Duluth

Bridge Approach
Wausau, Wis.
2318 lb. concrete in 3 days
Average of 4 test cylinders

Roof Slab *(A Winter Job)*
Morgantown, W.Va.
2115 lb. concrete in 3 days
Average of 2 test cylinders
Consolidated Construction Co., Morgantown, W. Va.



Send the coupon for your copy

Name_____

Address_____

Universal Portland Cement Co.
208 So. La Salle Street, Chicago

Without obligation, please send me your new booklet giving full details for securing strong concrete in 3 days with the usual materials and labor.

C.M. 2-29

—*High-Early-Strengths* Shown in These Tables Are the Strengths You Can Get on the Job

Concrete as commonly mixed and placed reaches a compressive strength of about 2000 pounds per square inch in 28 days. The above examples show what you can accomplish with the usual grade of Universal cement in a fraction of this time.

Universal Portland Cement Co.
SUBSIDIARY OF U. S. STEEL CORPORATION
Chicago Pittsburgh Minneapolis Duluth Cleveland Columbus New York

One Standard Cement for All Concretes and Mortars

Construction Methods

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JAMES H. McGRAW, *Chairman of the Board*
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A monthly pictorial of field practice and equipment illustrating successful construction, maintenance and material-handling methods for general construction, highways, buildings, industrial plants and public works and utilities

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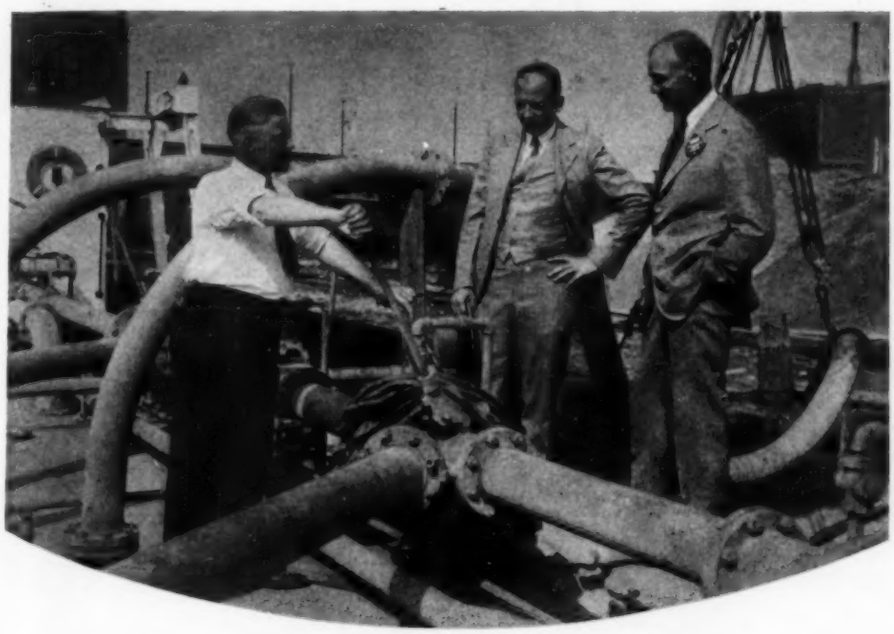
VOLUME 11 | NEW YORK, FEBRUARY, 1929 | NUMBER 2



COMPRESSED AIR *(left)* in 5-in. pipe conveyor system transports bulk cement from boat to bins on shore. *(Left to right)* George Allen, superintendent of construction; C. A. Welles, general manager, Merchandise Mart, and C. C. West, president, Manitowoc Portland Cement Co.

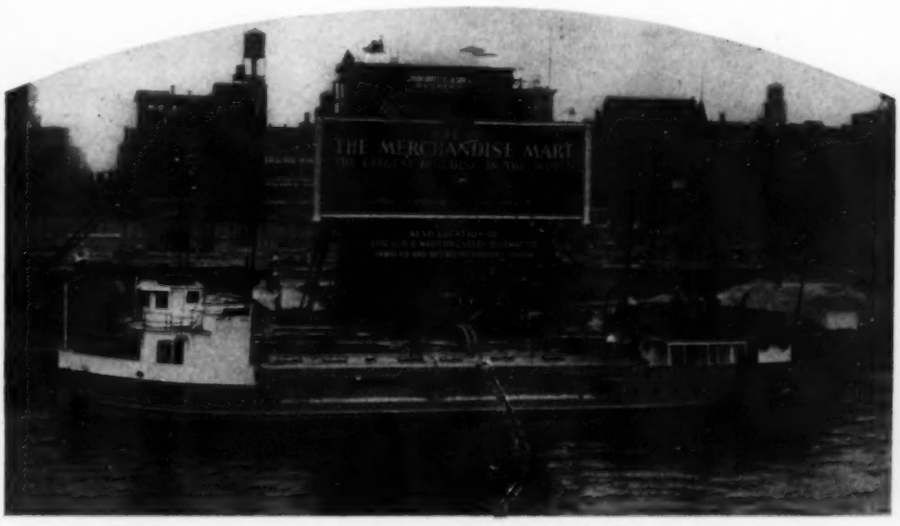
CEMENT BLOWN
from Boat to Bins

DIRECT from boat to mixer bin by air pressure through a system of 5-in. piping—that's the way John Griffiths & Sons Co., general contractor, is delivering cement in bulk for the foundations of the world's largest business building, the Merchandise Mart, Chicago, which will have a total floor area of 4,000,000 sq.ft.

For the transportation of cement from the plant of the Manitowoc (Wis.) Portland Cement Co. to the job, alongside the Chicago River, a steel ship, the "Daniel McCool," has been specially designed and equipped. The hull, 156 ft. long, 33-ft. 9-in. beam, with a full-load draft of 13 ft., is fitted with six cement bins, or compartments, three on each side, tapped by outlets equipped with Star feeders which discharge through short spouts on to two 14-in. screw conveyors, one under each row of bins. In the unloading operation the cement travels aft to two 8-in. Fuller-Kinyon pumps, one for each screw conveyor, which discharge into two 5-in. conveying conduits, connected through flexible metal hose to pipes on shore loading directly to a large cement storage bin over the mixer.

Compressed air for carrying the cement on its 250-ft. trip from boat to bin is supplied by two 350-cu.ft.-per-minute single-stage compressors delivering at 100-lb. pressure. A feature of the power equipment of the boat is a pair of 240-hp. Fairbanks-Morse Diesel engines which propel the vessel and, through clutch couplings and 200-kva. generators operate the cement unloading and other machinery while the boat is docked.

At the cement plant the "Daniel McCool" is loaded by equipment similar to that described for the unloading operations.

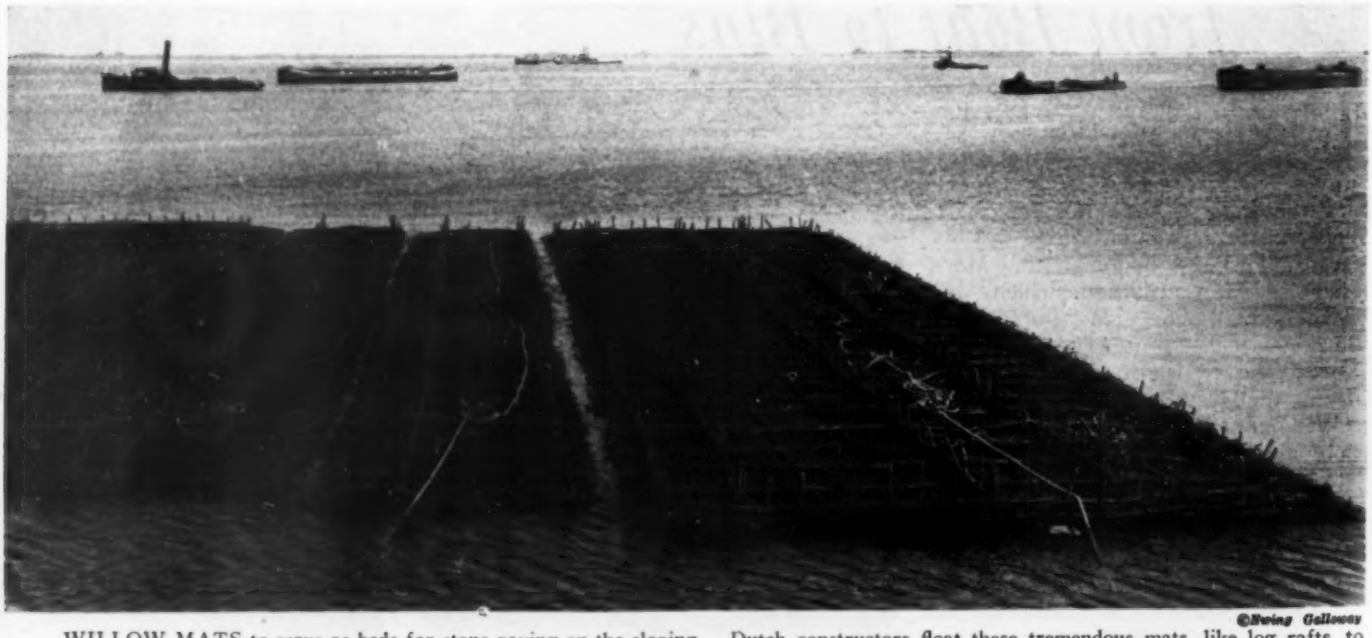


CEMENT CARRIER. The steel vessel, "Daniel McCool," is specially equipped to load and unload bulk cement quickly.

This Month's

TALLEST BUILDING in the world as it will appear when completed. The 68-story Chrysler Building, which has just been started near Grand Central Terminal, New York City, will rise 808 ft. above the sidewalk. Fred T. Ley & Company, Inc., is the general contractor.

STEEL ARCH BRIDGE across the River Tyne in England, connecting Newcastle and Gateshead, is now carrying traffic. The two-hinged steel arch has a span of 531 ft. and a rise of 170 ft. Methods of tying back halves of arch by cables until closure and of suspending 38-ft. roadway by hangers from arch were illustrated, respectively, on p. 5 of *Construction Methods*, April, 1928, and on p. 5, July, 1928.

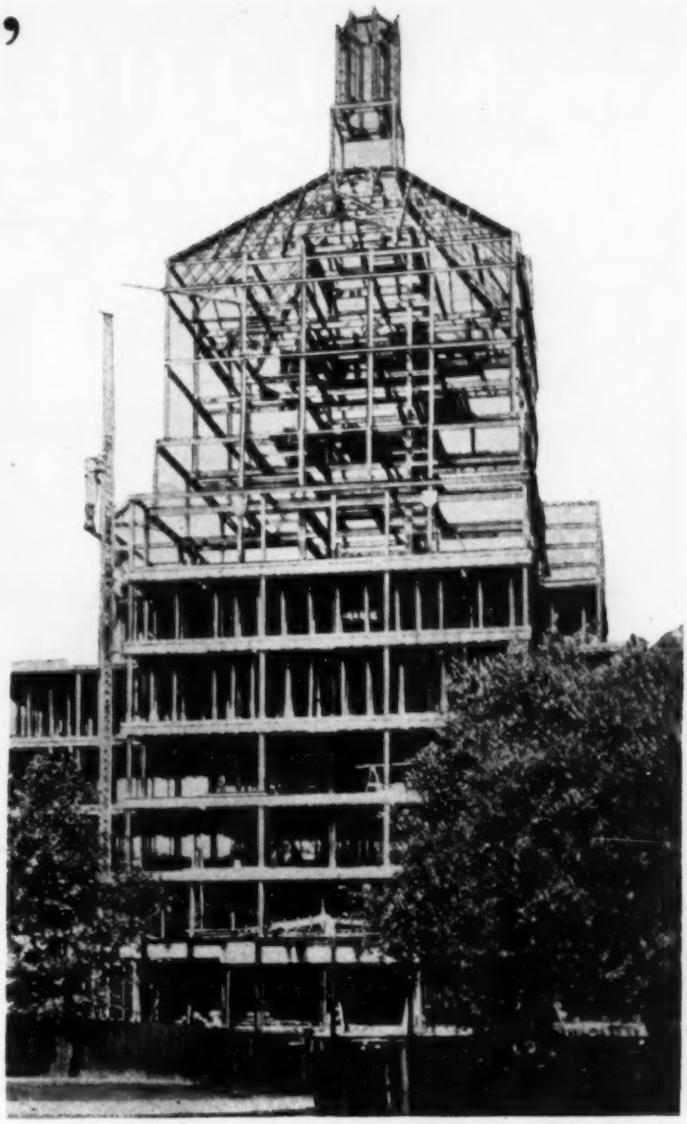


©Ewing Galloway

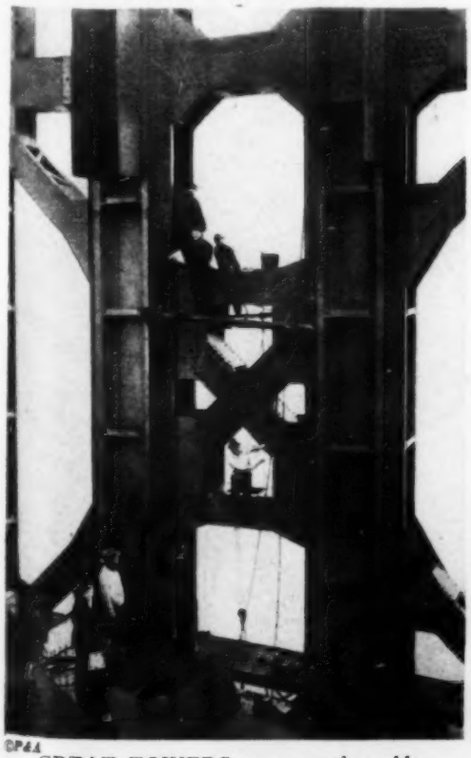
WILLOW MATS to serve as beds for stone paving on the sloping sides of Holland's Zuider Zee dike, the 20-mile long dam which will shut out the North Sea and reclaim 900 square miles of land. Dutch constructors float these tremendous mats, like log rafts, to the spot where they are loaded with stone and sunk to the bottom. The great dam project will be completed by 1934.

"News Reel"

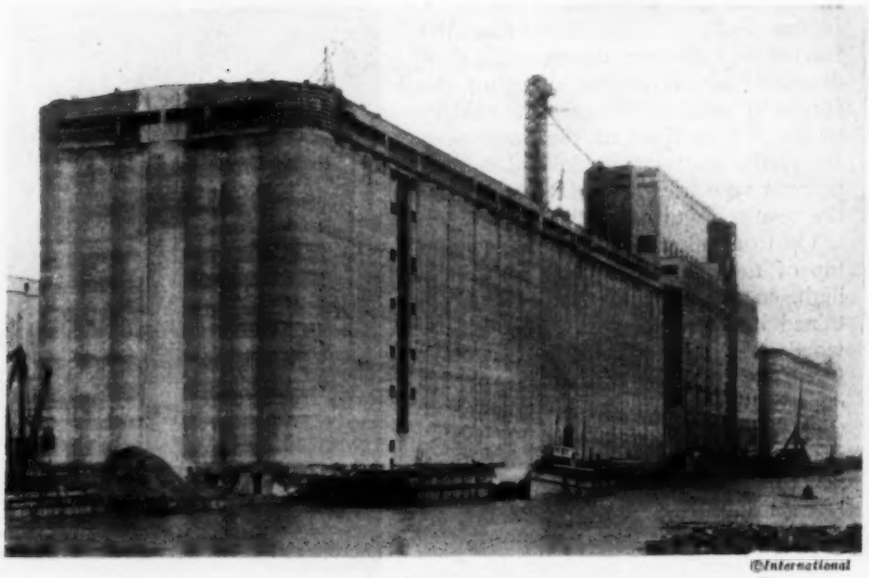
DIVER aids the Raymond Concrete Pile Company in drying up the foundation of the new Commerce Department Building at Washington, D. C. In excavating sumps necessary to lower the ground water level while cast-in-place piles are poured, the diver digs at the bottom of a 5-ft. cylindrical steel caisson to a depth 18 ft. below the water surface.



NOISELESS ERECTION was specified by the owners of the Homestead Hotel, Hot Springs, Va., when they ordered an eleven-story steel frame addition to the hostelry. Westinghouse arc-welding equipment enabled the contractor to erect the steel frame without annoyance to the guests.



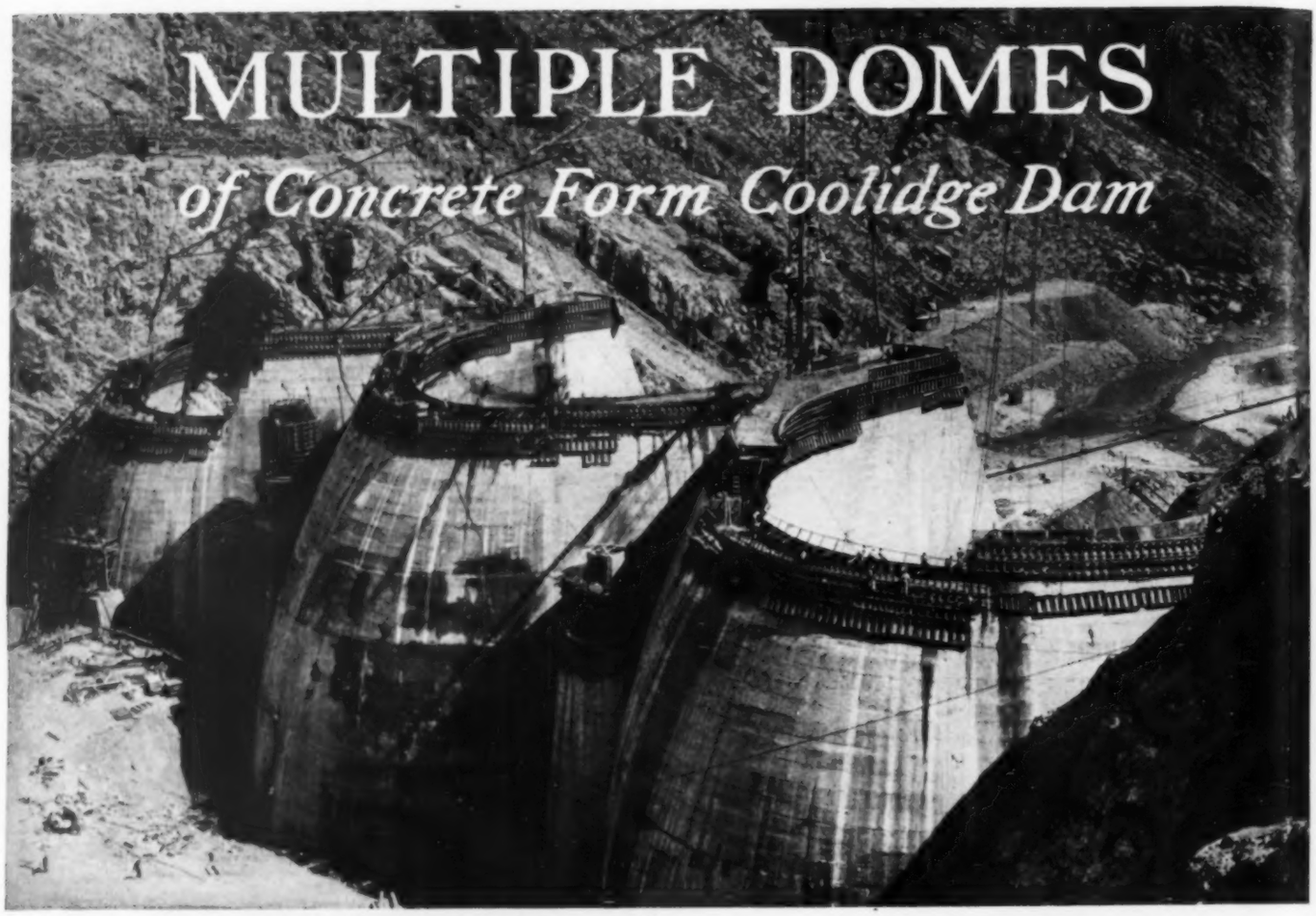
GREAT TOWERS to carry the cables of the world's longest suspension span rapidly rise above the waters of the Hudson River at New York City as the McClintic-Marshall steel workers push erection of the structures.



©International

WHEAT ELEVATOR to hold 6,900,000 bu. of grain at Saskatchewan, Can. The new elevator cost its owner, the Saskatchewan Wheat Pool, a farmers' marketing association, $5,000,000.

MULTIPLE DOMES
of Concrete Form Coolidge Dam

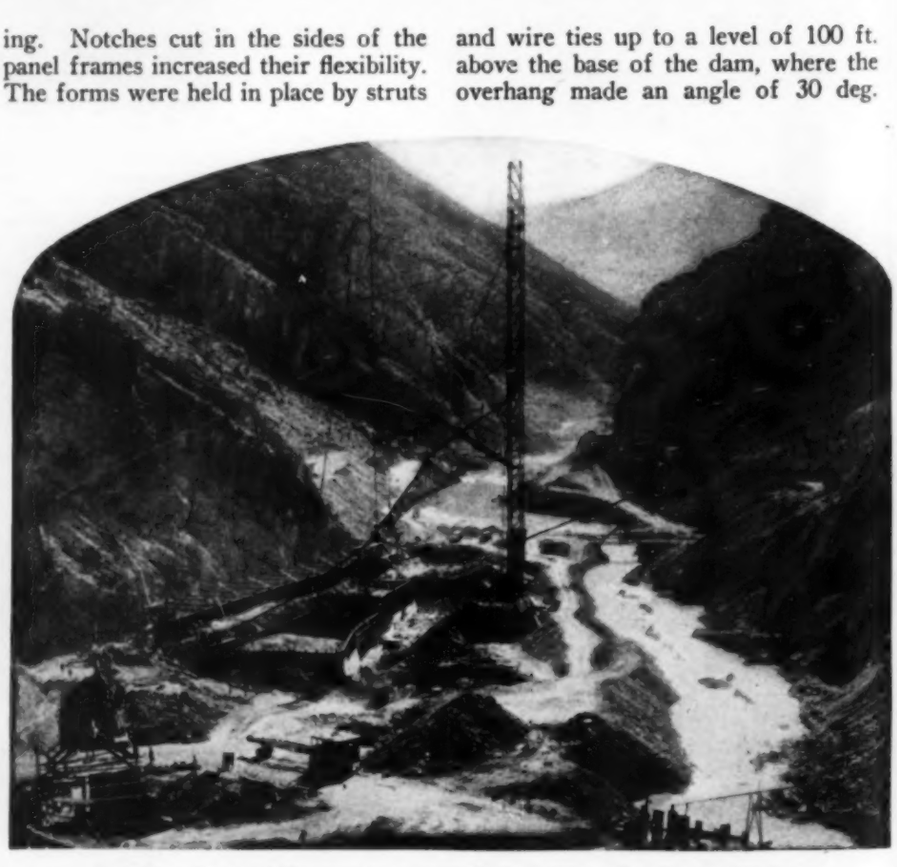


FLEXIBLE FORMS consisting of wood panels aided concreting of warped dome surfaces.

FLEXIBLE panel forms of wood proved to be the solution for the key problem of placing concrete in the three huge, egg-shaped "domes" forming the $4,500,000 Coolidge dam, a structure of unique design built by the Atkinson, Kier Brothers, Spicer Company across the Gila River in Arizona to store water for irrigation on the San Carlos project of the U. S. Indian Service. Realizing that the success of the entire construction plan depended largely on the ability of the forms to mold the concrete accurately to the curved lines of the dome surfaces, the contractors devised an ingenious type of form which produced the results required.

Up to an elevation 20 ft. below the top of the structure, which is 251 ft. high, concrete for the domes was retained by forms consisting of 4x8-ft. wood panels, constructed with enough flexibility to allow them to shape the curved surfaces of the domes and at the same time rigid enough to remain securely in place. The form panels, as built, were bent as easily as 1-in. boards and were used repeatedly on dome curves of differing radius.

Each form panel consisted of three rectangular frames of 2x6-in. studs and plates, lagged with 1x6-in. sheeting. Notches cut in the sides of the panel frames increased their flexibility. The forms were held in place by struts and wire ties up to a level of 100 ft. above the base of the dam, where the overhang made an angle of 30 deg.



RIVER CONTROL required the building of a wood flume 450 ft. long with a capacity of 10,000 cu.ft. per second.

with the vertical. Beyond this point a "wishbone-and-waling piece" method of form support was employed, the "wishbone" consisting of a 1-in. steel rod bent into the shape of an inverted V embedded in the concrete to support the form panel for the upstream face of the dome and provide anchorage for tie wires for the downstream form. The spacing of the wishbones varied from 8 to 3 ft., depending on the degree of curvature of the concrete surface. From each wishbone tie wires extended through the forms to an upper and lower waling piece consisting of a pair of 2x4's. After each panel was set, it was warped to exact shape, spiked through its lower plate to the panel below and the waling pieces were brought to the desired curve by wedges under the tie wires.

In stripping the dome forms, after pouring, the practice was to leave at least two panels below the freshly poured concrete, thus giving each lift at least 7 days to harden.

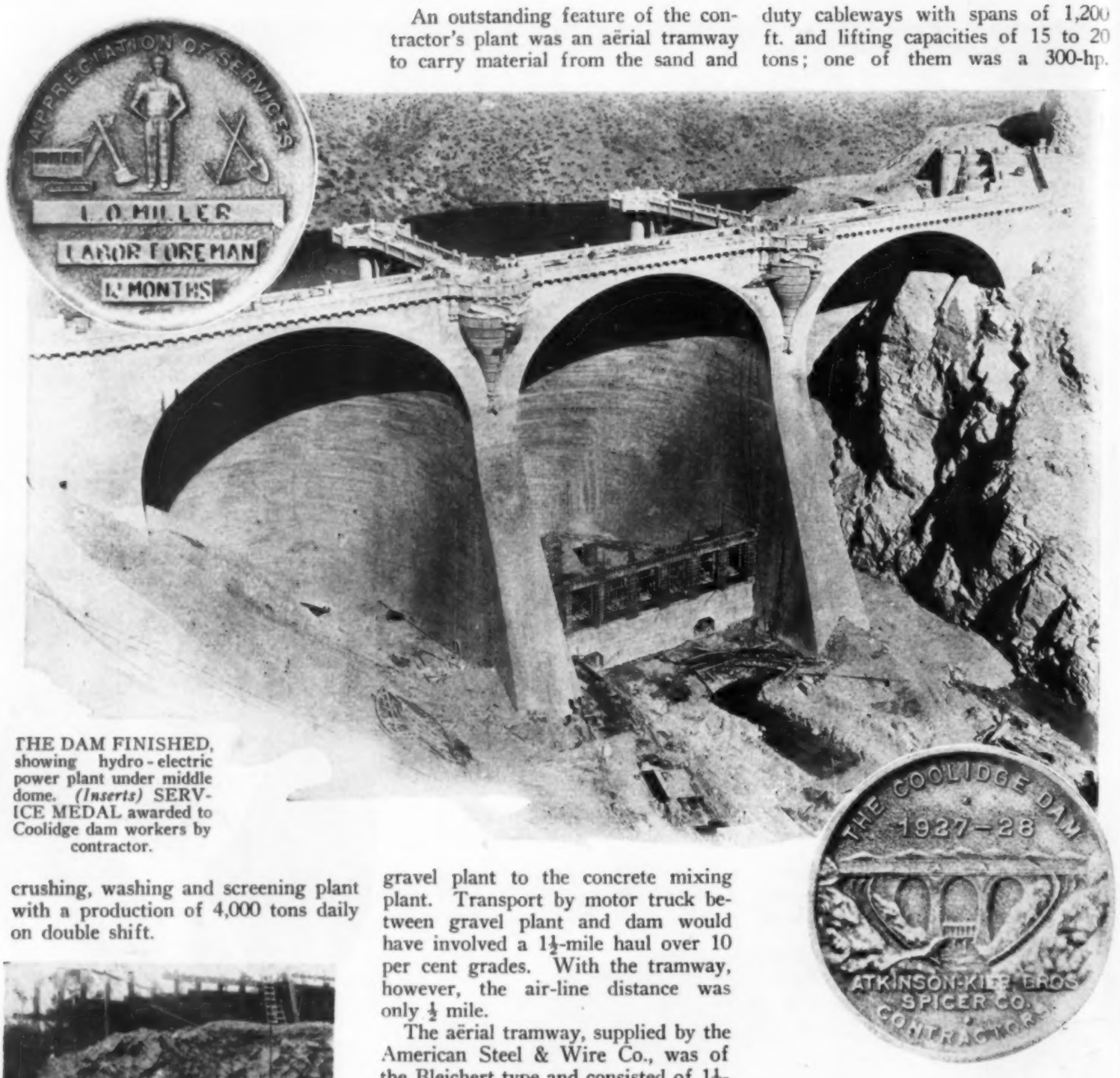
The Coolidge dam, 251 ft. high and 180 ft. wide, designed by Major C. R. Olberg, who also directed its construction for the U. S. Indian Service, is the first multiple-dome dam ever built. It involved the diversion of the Gila River through a flume 27 ft. wide, 14 ft. high and 450 ft. long of 6x12-in. splined piling cofferdam construction and the excavation of about 300,000 cu.yd. of rock for the foundations and spillway channels of the dam, and the mixing and placing of 201,000 cu.yd. of concrete with a plant designed to produce 2,000 cu.yd. per day or 50,000 cu.yd. per 25-day month.

Sand and gravel aggregate for the concrete mixtures was obtained from the river bed about a mile downstream from the dam and delivered to a

CONCRETE PLACEMENT was handled by inclined chutes from a tower 400 ft. high, equipped with a 2-yd. hoisting skip.

LYNN ATKINSON, member of contracting firm which built the Coolidge dam.

CONCRETE DOMES begin to take shape within the steep canyon walls. Flume at left by-passes Gila River.



THE DAM FINISHED, showing hydro-electric power plant under middle dome. *(Inserts)* SERVICE MEDAL awarded to Coolidge dam workers by contractor.

An outstanding feature of the contractor's plant was an aërial tramway to carry material from the sand and crushing, washing and screening plant with a production of 4,000 tons daily on double shift.

PLACING STEEL reinforcement at the bedrock line of one of the domes of the dam.

gravel plant to the concrete mixing plant. Transport by motor truck between gravel plant and dam would have involved a 1½-mile haul over 10 per cent grades. With the tramway, however, the air-line distance was only ½ mile.

The aërial tramway, supplied by the American Steel & Wire Co., was of the Bleichert type and consisted of 1½-in. cable on the load-carrying side and ⅞-in. cable on the empty side. Its capacity was 150 tons per hour, requiring only 50 hp. for its operation. Buckets were of 20-cu.ft. size carrying 1 ton of material. Traction cable was ¾-in. plow steel. The tramway profile involved a 30-deg. angle at its summit where a breakover structure was installed.

The tramway discharged at a mixing plant, on the canyon side above the dam, equipped with Blaw-Knox batching hoppers and two 2-yd. Smith tilting mixers delivering through 450-ft. of 18-in. Lakewood chute line to a 400-ft. Insley tower plant operating a 2-yd. skip.

For handling reinforcing and structural steel, gates, valves, penstock pipe and other metal, the contractor installed across the dam site, two heavy duty cableways with spans of 1,200 ft. and lifting capacities of 15 to 20 tons; one of them was a 300-hp. Lidgerwood, and the other a 120-hp. Washington.

Most of the plant for the Coolidge dam construction was electrically operated and involved a cost, erected in place, estimated by H. B. Hull, office manager for the contractor, at more than $1,000,000, including river control.

For the contractors, Elmer Kier, C. A. Spicer and Lynn Atkinson have been resident co-partners, with James G. Tripp in immediate charge as superintendent.

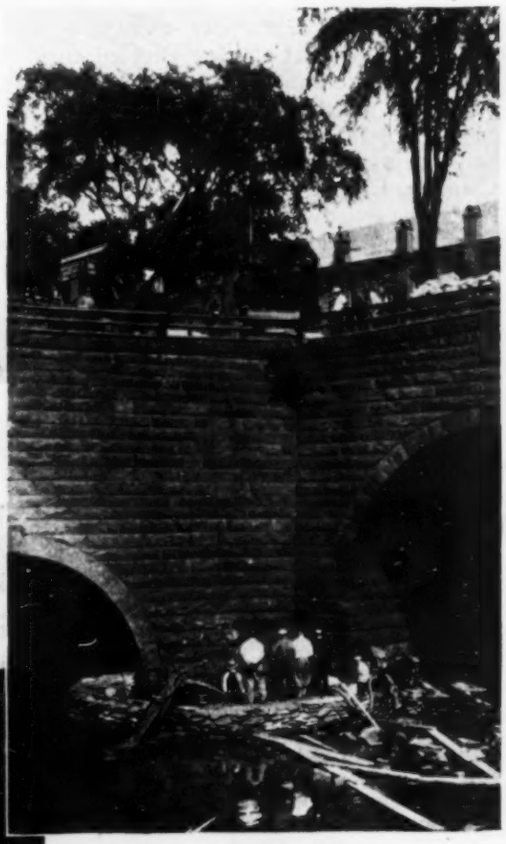
COMING: An 8-mile tunnel completed in 3 years is the astounding record made by A. Guthrie & Company in driving and lining the Great Northern Railway's new bore through the Cascade Range. The March issue will show how.

CRANE SERVICE JOBS

HERE are a few examples indicating the variety of construction service that constitutes the day's work for a truck-mounted crane. The pictures cover jobs handled by the fleet of four mobile cranes operated by the Universal Crane Service Co., of Springfield, Mass., under the direction of E. R. Peckham. "Even after years of experience in this line of work," says Mr. Peckham, "every job we tackle presents new problems or new ways to use our equipment."

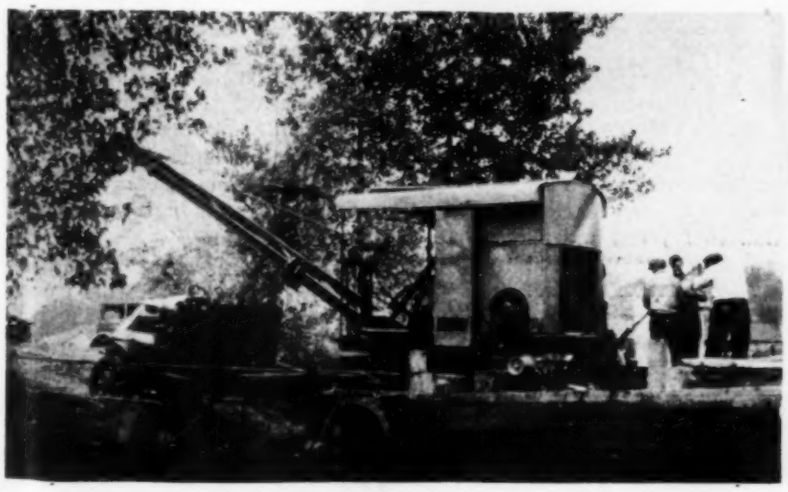
As the photographs show, wheels, crawlers, and barges all serve in their time as mountings for the cranes.

A WINTER JOB, between Stockbridge and Great Barrington, where crane operated on ice. Oak planks 3 in. thick distributed weight of machine while digging out 2 ft. of swamp growth with clamshell bucket to make clear water lake.



A LONG REACH. Digging for bridge footing 45 ft. below sidewalk level during street widening operations at Springfield Water Shops.

CRIBBING OUT the bank of a brook to extend the reach of the crane boom to the other side in driving piles for Lane Construction Co.



"OFF AGIN, ON AGIN!" Universal crane returning to its Mack truck mounting after river service on pontoon.

IN AMPHIBIAN ROLE. Crane transferred from truck to barge mounting for digging pipe line river crossing trench near Springfield.

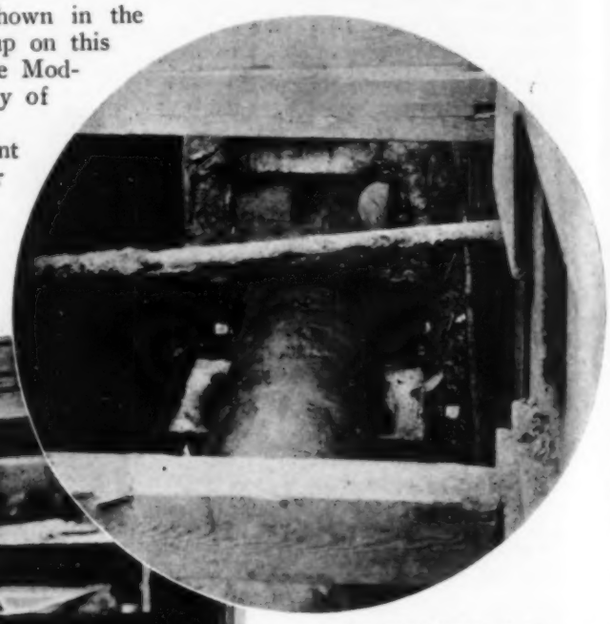
Pipe Joints Welded and Annealed

to Make High-Pressure Steam Line Safe

ON ITS new 18-in. diameter high-pressure steam line laid 10 to 14 ft. deep for a length of ¼ mile under the streets of the busiest section of the city, the Philadelphia Electric Company decided to use every precaution against the possibility of a break in the line after it had been placed in service. A ½-in. thickness was adopted for the steel pipe walls, and in addition to jointing the pipe lengths by the oxy-acetylene welding process, the final safety measure consisted of annealing each welded joint with special heat-treating equipment and reinforcing it with a welded steel collar. The work was done under contract by the Northeastern Piping & Construction Company, the construction division of the American District Steam Company of North Tonawanda, N. Y.

To facilitate the welding process, pipe sections were delivered on the job with chamfered edges. Welding was done in the bottom of the trench (12 to 18 ft. deep) with a Mecco torch, shown in the lower photo of the group on this page, and supplied by the Modern Engineering Company of St. Louis, Mo.

After welding, each joint was then annealed for a distance of 6 in. on each side of the weld, thus requiring a ring of steel 13 in. wide, 60 in. in circumference and ½ in. thick to be heated evenly to a dull cherry red and allowed to cool slowly. A special furnace consisting of a heavy steel jacket, in halves, lined with fire-resisting clay, was used for this purpose, as shown in the two upper pictures. Heat was produced by an atomizing compressed air oil burner designed especially for this job; it was supplied by H. H. Kress, of Philadelphia. This burner produces a soft, non-oxidizing heat, considered best for annealing welded joints. An Ingersoll-Rand portable compressor furnished the needed supply of dry air to the atomizing oil burner.



TWO HALVES of furnace *(above)* one in place underneath pipe joint and the other ready to be superimposed on top. Furnace halves are lined with fire-resisting clay.

SPECIAL OIL BURNER *(above)* and furnace for annealing joint after weld has been made.

OXYACETYLENE TORCH completing weld on joint for 18-in. high-pressure steam pipe line in timbered trench 14 ft. below street level. Pipe sections were delivered with chamfered edges to facilitate welding operations.

Suspended in proper position, with flame directed downward, the burner consumed approximately 12 cu.ft. of free air per minute at 60 lb. per square inch pressure, using a cheap grade of fuel oil costing 8 cents per gallon. The total cost of preheating, including the labor for placing the hood, the two-section furnaces, and air compressor operation and maintenance, was less than $2.50 per joint. The burner produced a flame 4 in. in diameter and 36 in. long, clear white at the cone, indicating a high percentage of combustion.

The last stage of the annealing process consisted of leaving the furnace in place an ample time for cooling, to prevent contraction strains in the pipe line joints.

As a final extra precaution against breaks in the high-pressure steam line a collar of steel 12 in. wide and ⅜ in. thick, was welded on each side around the annealed joint and the pipe was then heavily coated with asbestos.

FOUR-PILE BENTS carry the steel and concrete deck structure. Where the unsupported length of the piles is great, the cap is placed at the surface of the water, and columns to support the deck are erected on top.

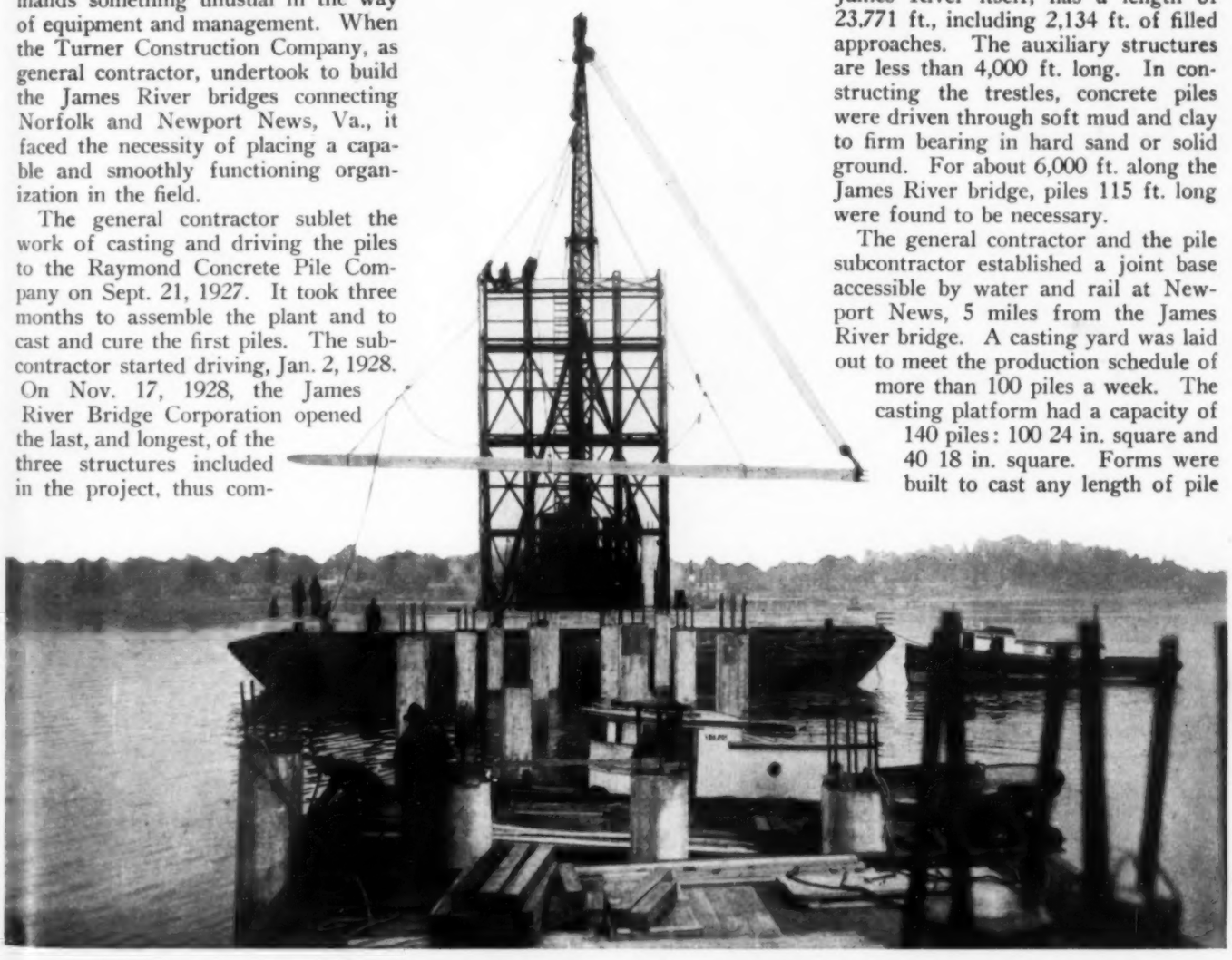
PILES... *by the Thousand*

TO COMPLETE 5 miles of concrete pile trestle, requiring 2,752 precast piles, in 10½ months demands something unusual in the way of equipment and management. When the Turner Construction Company, as general contractor, undertook to build the James River bridges connecting Norfolk and Newport News, Va., it faced the necessity of placing a capable and smoothly functioning organization in the field.

The general contractor sublet the work of casting and driving the piles to the Raymond Concrete Pile Company on Sept. 21, 1927. It took three months to assemble the plant and to cast and cure the first piles. The subcontractor started driving, Jan. 2, 1928. On Nov. 17, 1928, the James River Bridge Corporation opened the last, and longest, of the three structures included in the project, thus completing the through route between the two Virginia cities.

The longest bridge, crossing the James River itself, has a length of 23,771 ft., including 2,134 ft. of filled approaches. The auxiliary structures are less than 4,000 ft. long. In constructing the trestles, concrete piles were driven through soft mud and clay to firm bearing in hard sand or solid ground. For about 6,000 ft. along the James River bridge, piles 115 ft. long were found to be necessary.

The general contractor and the pile subcontractor established a joint base accessible by water and rail at Newport News, 5 miles from the James River bridge. A casting yard was laid out to meet the production schedule of more than 100 piles a week. The casting platform had a capacity of 140 piles: 100 24 in. square and 40 18 in. square. Forms were built to cast any length of pile



A SLING PICKS UP THE 115-FT. PILES at four points to set them in the leads. It keeps an almost uniform load on the four pick-up points while the pile is turned from the horizontal to the vertical. The derrick takes the place of head blocks on the leads, doing away with the need for high leads to handle the long piles.

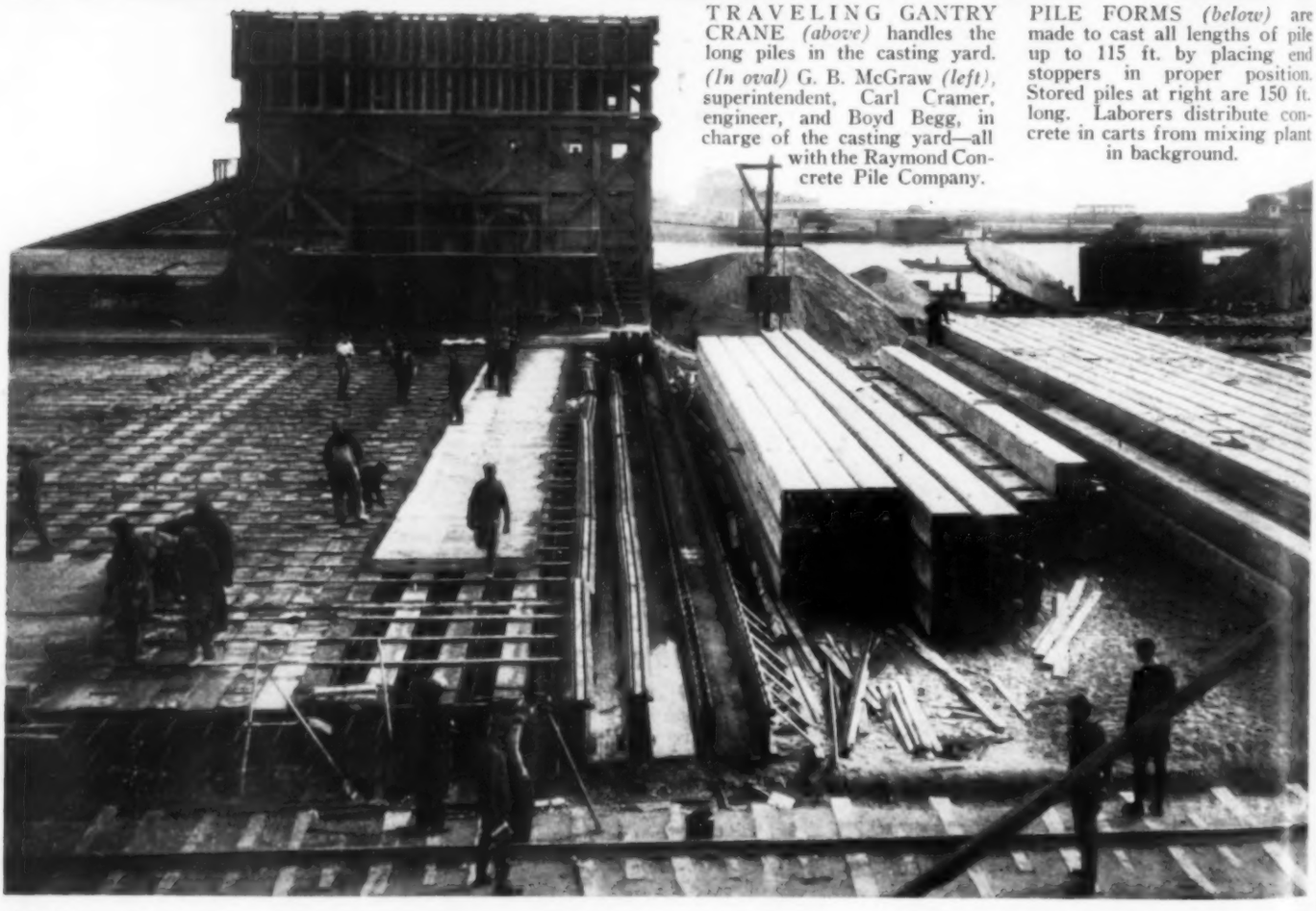
up to 115 ft. A 125-ft. gantry crane traveled along a 1,200-ft. runway and served the reinforcing steel yard, cage fabricating platform, casting platform, storage yard for curing piles, and barge slip, where the gantry loaded the piles for shipment to the bridge sites.

The electrically operated mixing plant, equipped with two Rex 1-yd. mixers, produced 450 cu.yd. of 1:4½, 2-minute mix, concrete a day. Three or four T-bolts, cast in each pile, afforded a means of lifting the piles from the forms at the end of 7 days. Equalizing blocks on the gantry put a uniform load on the T-bolts.

Water was shallow at the three bridge locations except in the channels. Dredges

TRAVELING GANTRY CRANE *(above)* handles the long piles in the casting yard. *(In oval)* G. B. McGraw *(left)*, superintendent, Carl Cramer, engineer, and Boyd Begg, in charge of the casting yard—all with the Raymond Concrete Pile Company.

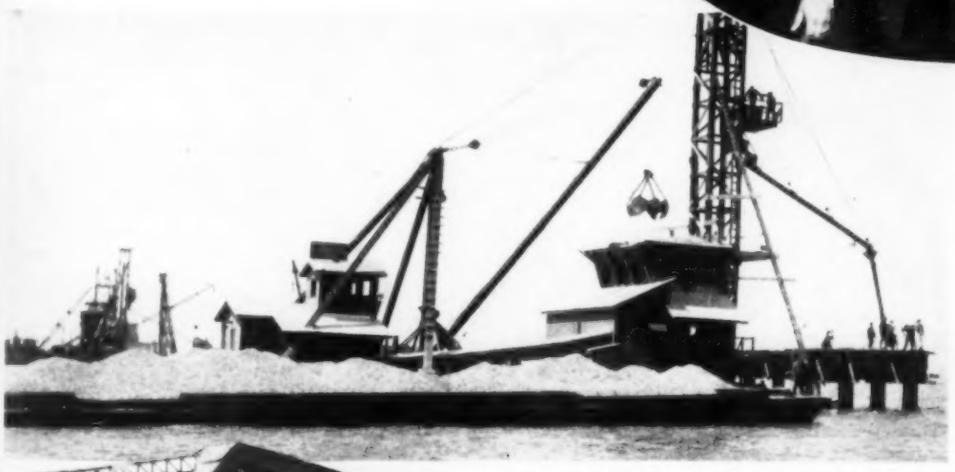
PILE FORMS *(below)* are made to cast all lengths of pile up to 115 ft. by placing end stoppers in proper position. Stored piles at right are 150 ft. long. Laborers distribute concrete in carts from mixing plant in background.



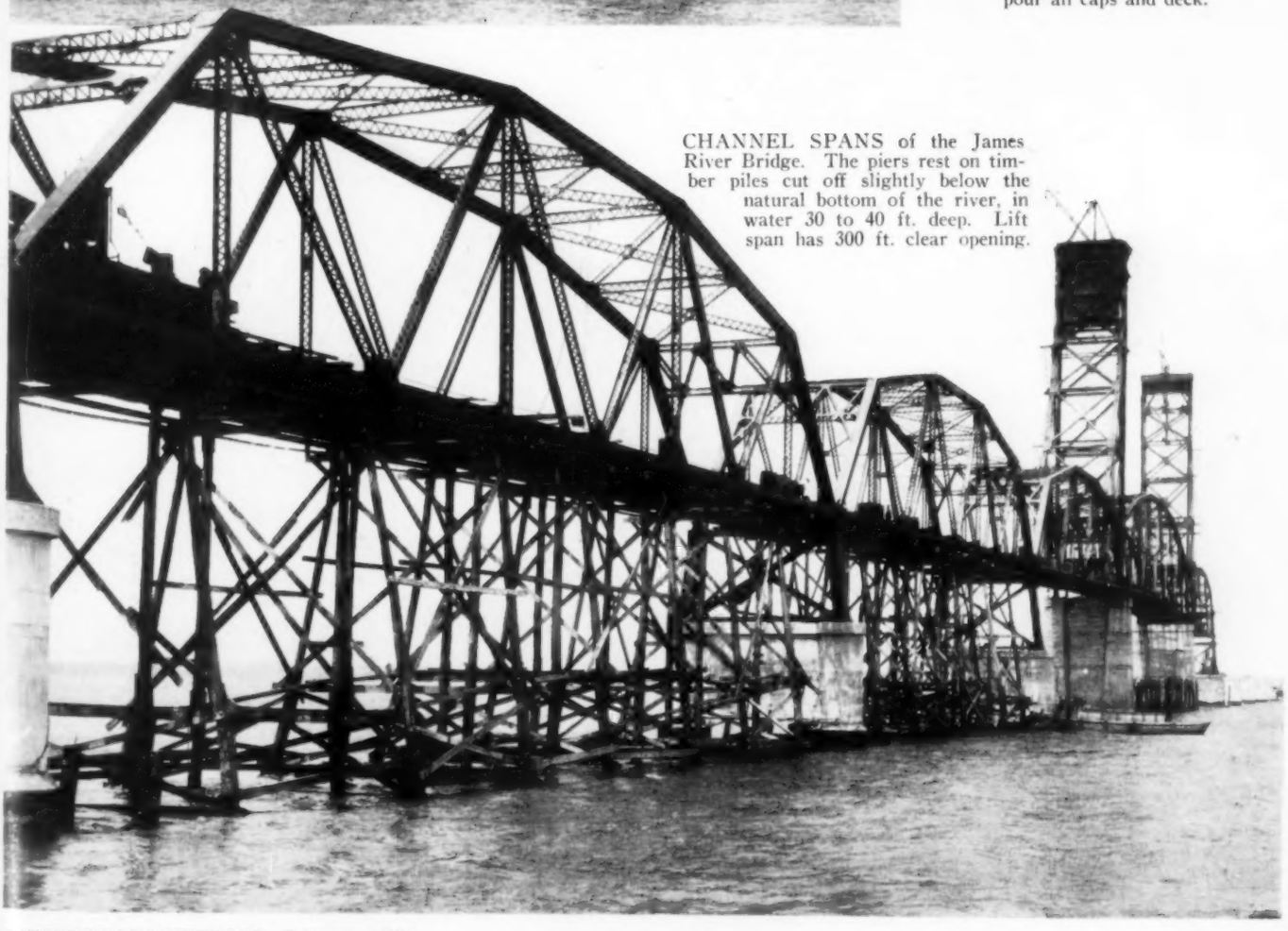
opened construction canals of 180-ft. width and 6½-ft. minimum depth from the channel to the shore at each site. The canals made it possible to use the four-lead piledriver and floating concrete plants on all parts of the work.

Both gantry crane and four-lead piledriver had been used by the Raymond Concrete Pile Company to build the concrete trestle across Lake Pontchartrain, as described in *Construction Methods*, November, 1927. They were remodeled to handle 115-ft. piles. The piledriver carried two 7,500-lb. steam hammers, built into sliding assemblies, and a steel stiff-leg derrick capable of lifting and setting a 35-ton pile in the leads. Four piles in a bent were spotted

SUPERVISING OPERATIONS: William Willoughby (*left*), resident engineer for the J. E. Greiner Company, and H. B. Pope and H. W. Roberts, superintendent and engineer, respectively, for the Turner Construction Company



FLOATING CONCRETE PLANT of the Turner Construction Company. Two of these plants pour all caps and deck.



CHANNEL SPANS of the James River Bridge. The piers rest on timber piles cut off slightly below the natural bottom of the river, in water 30 to 40 ft. deep. Lift span has 300 ft. clear opening.

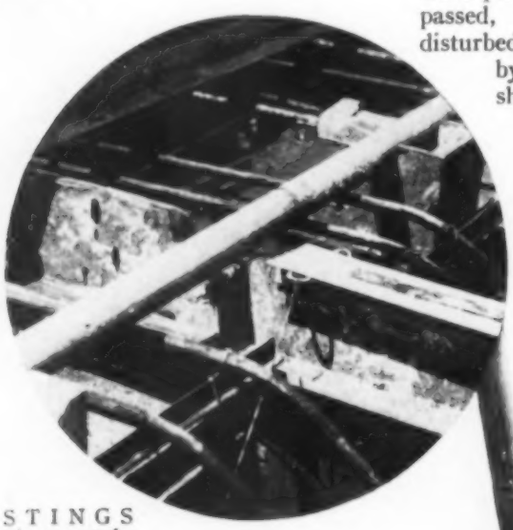
in one position of the leads and were driven two at a time. By using a derrick to lift and set the piles, need for leads of excessive height was obviated. A special sling picked up the 115-ft., 35-ton piles at four points and kept an almost uniform load on the four pick-up points while the pile was being turned from the horizontal to the vertical.

In general, the concrete bridge decks are carried on four Carnegie 30-in. I-beams supported by four-pile bents on 44-ft. centers. An eight-pile bent is placed at every sixteenth bay. Piles are 18x18 in. or 24x24 in., depending on the total length and on the unsupported length. In most cases the unsupported portion was short enough to allow placing the cap at the elevation to carry the I-beams, as shown in the cover photograph. In deep water it was necessary to construct the cap at the surface and to erect columns on top with connecting walls between them. The cap to carry the I-beams was placed on top of the columns.

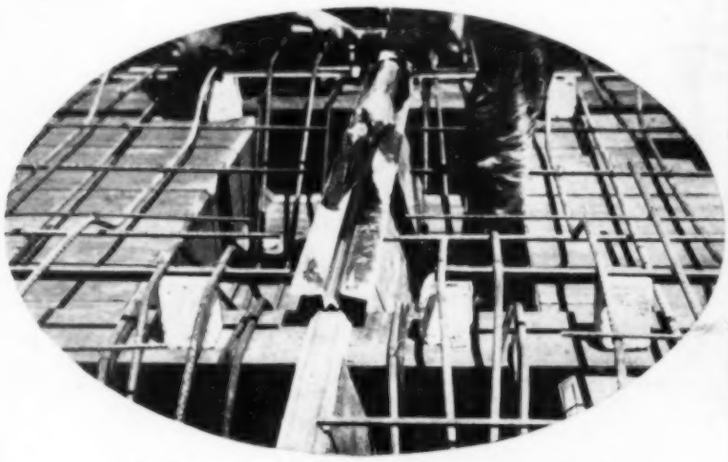
PIPE TRACK for finishing machine is pulled up after last passage of machine, and disturbed surface is finished by hand.

Mechanical finishing insured a smooth riding surface for the decks, which are 9 in. thick, with roadways 22 or 23 ft. wide between curbs. The finishing machine rode on pipes supported by castings. Pipe and castings were pulled up after the machine had passed, and workmen finished the disturbed surfaces by hand. The step-by-step story on pp. 142 and 143 shows the method of erecting the simple wood forms for the deck.

In general charge for the Turner Construction Company were R. C. Wilson, vice-president, and D. M. Bartlett, general superintendent. W. V. McMenimen, vice-president, and H. A. Christie, project manager, directed operations for the Raymond Concrete Pile Company. The J. E. Greiner Company, Baltimore, designed the bridges and supervised construction.



CASTINGS *(above)* support the pipe rails. Wire ties hold spot-welded angles which support joint material.



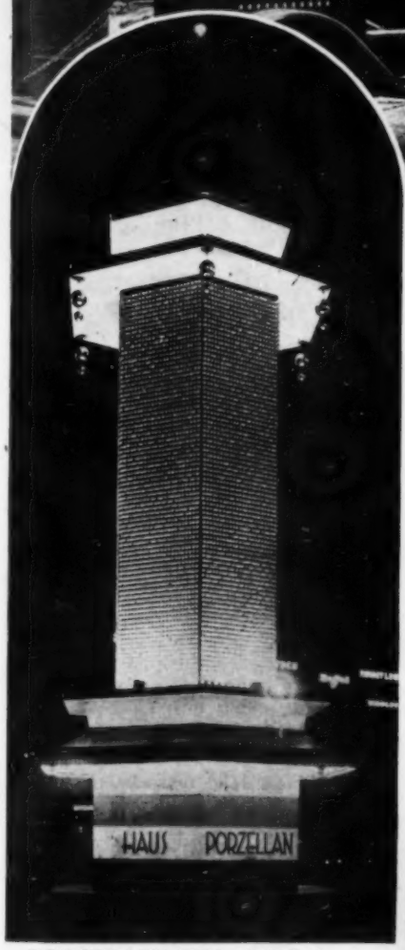
CRIMPED COPPER STRIP *(above)* placed beneath the joint material, prevents mastic from running out at the bottom of the joint in hot weather.

CONCRETE *(below)* for the deck is spouted from tower of floating plant and is finished by machine running on pipe track.

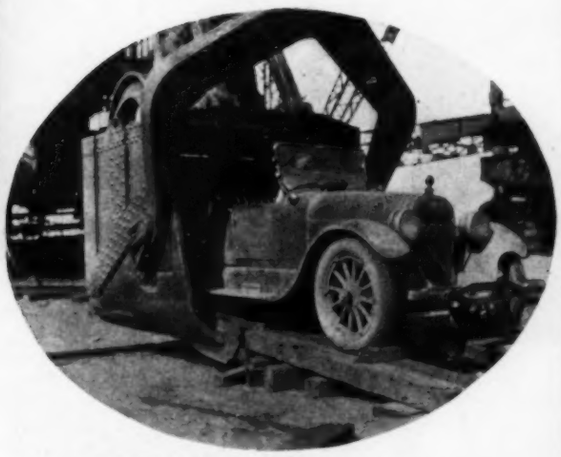
TO REMOVE GRIME from white tile walls of Holland vehicular tunnel between New York and New Jersey, Frederick T. Kenny, Brooklyn, designed this novel washing machine. It consists of a 2½-ton Mack truck, carrying an Ingersoll-Rand compressor furnishing air to chemical solution tanks and brushes on trailers. Rotary brushes, on swinging mast arms, are fed with a solution of tri-sodium phosphate to dissolve black carbon smudge on walls, brightening tunnel interior and thus aiding traffic.

JOB ODDITIES

A Monthly Page of Unusual Features of Construction



PORCELAIN TEA CUPS form the walls of this tower at the Leipzig Trade Fair. It serves to advertise an important German industry.

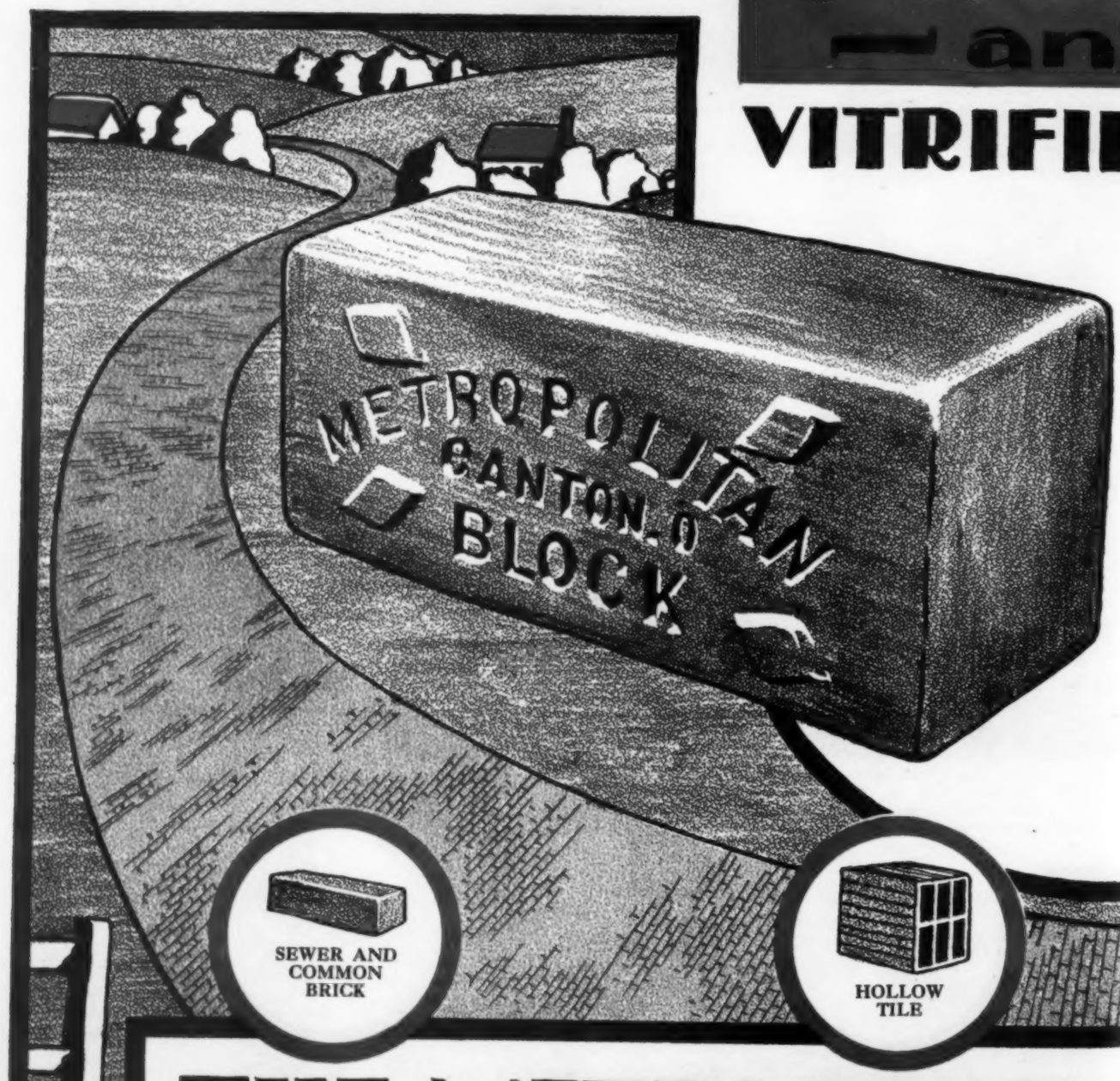


JUST A MOUTHFUL. Automobile fits nicely into the huge 12-yd. dipper of this new Marion power shovel.

A NEW TEST OF ROPE STRENGTH. Lil, 94-year-old elephant at Cincinnati Zoological Gardens, outpulls a team of Shriners in convention tug-of-war. The 1-in. Plymouth manila rope easily survived the ordeal.

TANK AND LOOKOUT TOWER are combined in this odd structure which the Chicago Bridge & Iron Works erected for a boy scout camp at Ponca City, Okla. Height, 94 ft. Tank diameter, 21 ft. Tank capacity, 30,000 gal.

Building today the
METROPOLITAN
—and
VITRIFIED PA



THE METROPOLITAN PA
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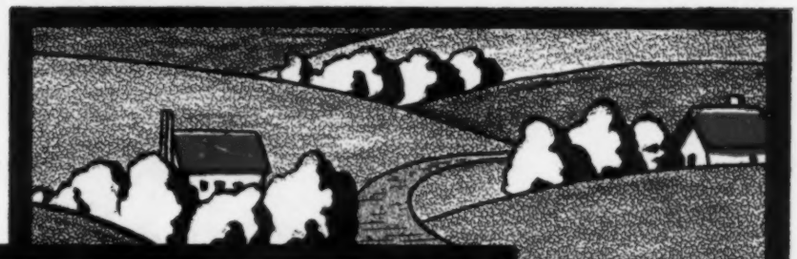
Executive Offices: {Renkert Bldg. Canton, Ohio

roads for tomorrow

—BESSEMER

OLEAN

PAVING BRICK



FOR roads to stand tomorrow's traffic abuse—to endure under adverse conditions — that will require a minimum of maintenance — Metropolitan Vitrified Paving Brick is recognized as a better, more substantial product.

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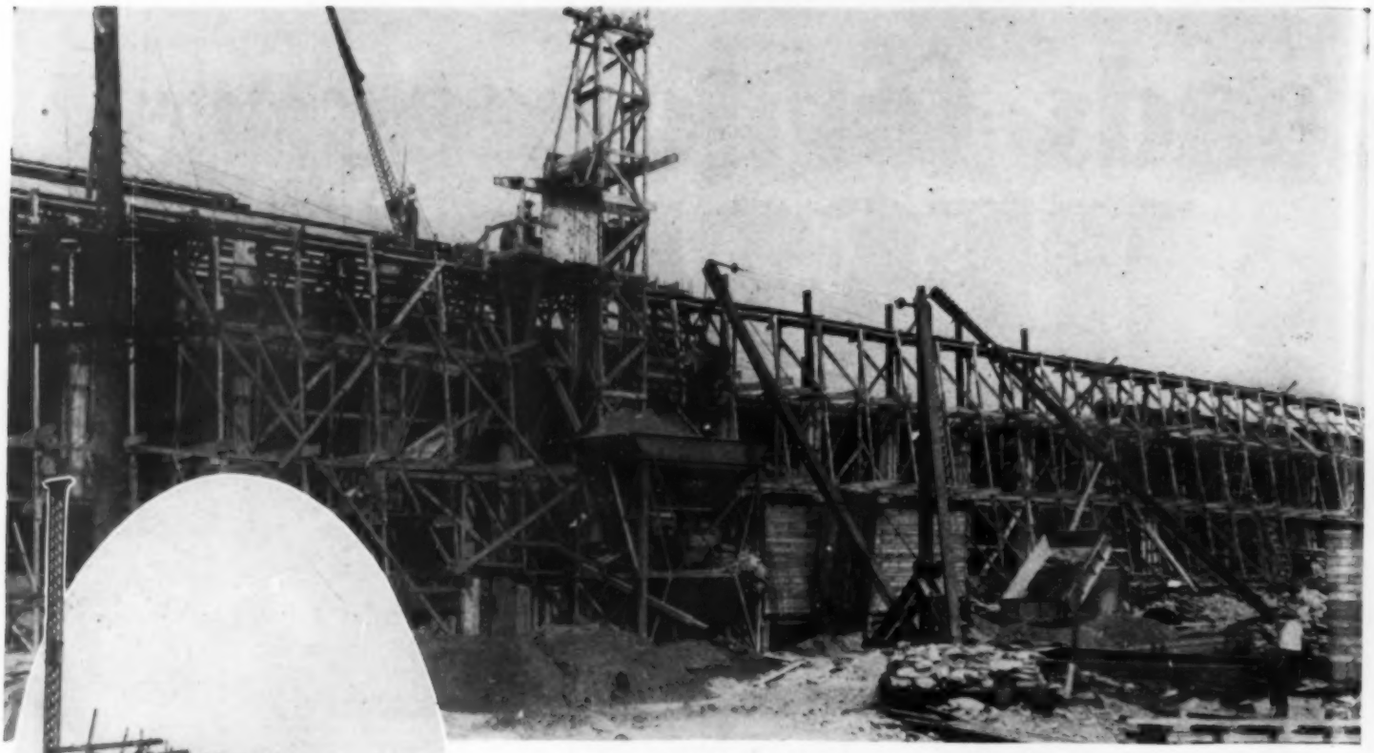


CENTRAL MIXING PLANT is placed at mid-point of south trestle. By stockpiling his materials the contractor is able to do all hauling with his own truck at such times as it is available for this service.

CONCRETE PLACED *on Buffalo*

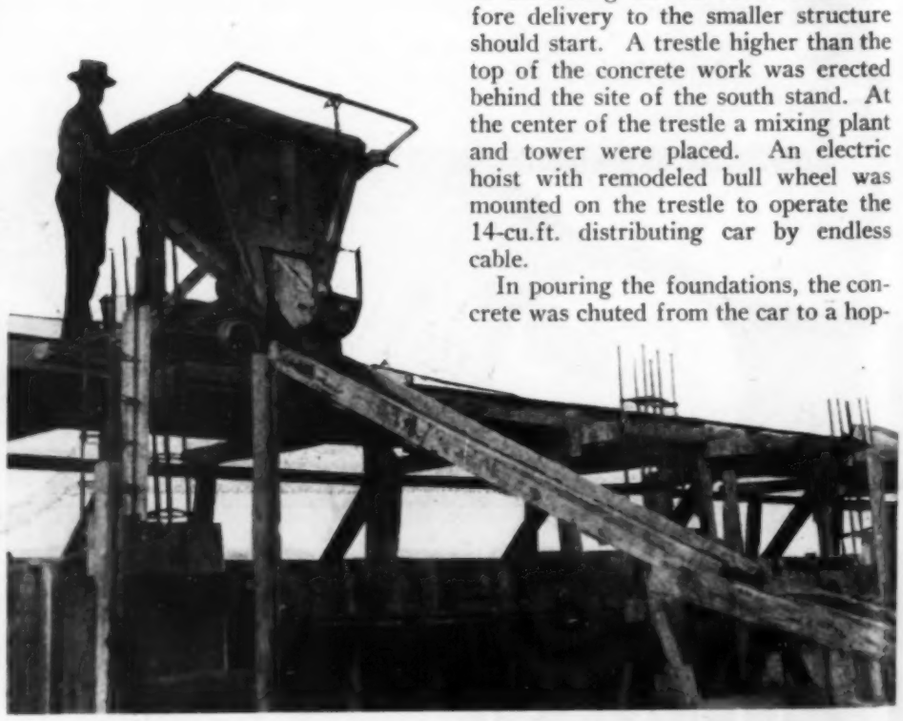
DUPLICATE TRESTLE *(left)* is erected to serve north stand. Concrete is hauled by truck from south trestle and elevated to car by mast-hoist.

TO distribute concrete for the stands of the Buffalo All-High School Stadium, a flexible plant capable of reaching all parts of the structures was needed. Contractor George Schaaf, debating the advantages of the mobile versus the central mixing plant, chose the latter with the addition of trestles for distributing the concrete. This combination offered the greatest freedom in placing concrete. The trestle costs chargeable to the concrete operation were minimized by the fact that the structures had a second use as bricklayers' scaffolds.

Roofed stands, rectangular in plan, flank the north and south sides of the playing field. The larger of these is the south stand, 440x85 ft. by 42 ft. high; the stand on the north side is 80 ft. shorter. A curved east stand, 380x 30 ft., connects the two major structures.

The construction plan worked out by Mr. Schaaf and his superintendent, Hector Estrup, called for completion of concreting on the south stand before delivery to the smaller structure should start. A trestle higher than the top of the concrete work was erected behind the site of the south stand. At the center of the trestle a mixing plant and tower were placed. An electric hoist with remodeled bull wheel was mounted on the trestle to operate the 14-cu.ft. distributing car by endless cable.

In pouring the foundations, the concrete was chuted from the car to a hop-



SIDE-GATE CAR, on endless cable, hauls concrete along trestle and discharges it into chutes.

LIGHT CHUTE SECTIONS, laid on the riser forms, make a flexible artery for distributing the wet concrete to all parts of a monolithic section of the stands.

FROM TRESTLES
Stadium Job

GEORGE SCHAAF *(right)*, contractor, built the stadium with the aid of Hector Estrup, superintendent.

COMING: The Raymond Concrete Pile Company is breaking all speed records in building a 7-mile trestle of precast concrete piles and deck across San Francisco Bay. An early issue will disclose the methods.

ELECTRIC HOIST, with remodeled bull wheel, operates the concrete car on an endless cable.

per on the ground, whence it was distributed in carts. To place the concrete in the stands, short, light, movable chute sections resting on the riser forms were used.

Rather than lose a week in moving the central mixing plant from the south to the north stand, Mr. Schaaf decided to haul concrete by truck from the south trestle to a duplicate structure serving the north stand. An Insley mast-hoist plant was erected at the midpoint of the north trestle. Trucks, loaded from a hopper at the east end of the south trestle, hauled the concrete to the mast-hoist.

The trestles were built with uprights the same dimensions as are used for scaffolds of equal height. Extra bracing was needed to give the structures stability.

Design and construction of the stadium were supervised for the Buffalo Board of Education by Ernest Crimi, architect, and James Gill, structural engineer.

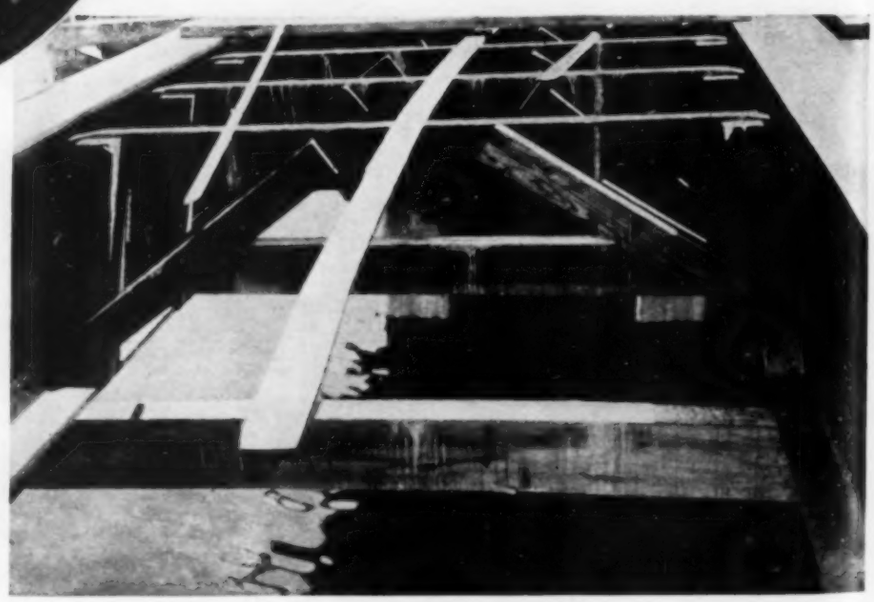
Step-by-Step
Setting Deck Forms

TO SUPPORT the deck forms on the James River bridges (see construction story, p. 33), the Turner Construction Company made use of the flanges on the four 30-in. I-beams. Jacks (timber horses) on the flanges of these girders supported the form panels. A cantilever beam fastened to the flanges of two I-beams by special lugs carried the exterior jacks which supported the form for the curb.

1 CANTILEVER BEAMS, fastened to the flanges of two girders, carry the jacks which support the outside deck and curb forms. The beams are 4x10-in. timbers.

2 SPECIAL LUGS grip the bottom flanges of the girders. The lug at the fixed end of the cantilever beam turns on a bolt.

3 OUTSIDE JACKS *(above)* to support the outside deck and curb forms rest on a 4x6-in. stringer laid across the cantilever ends of the beams. The jacks are carried by the stringer and the outside flange of the I-beam.

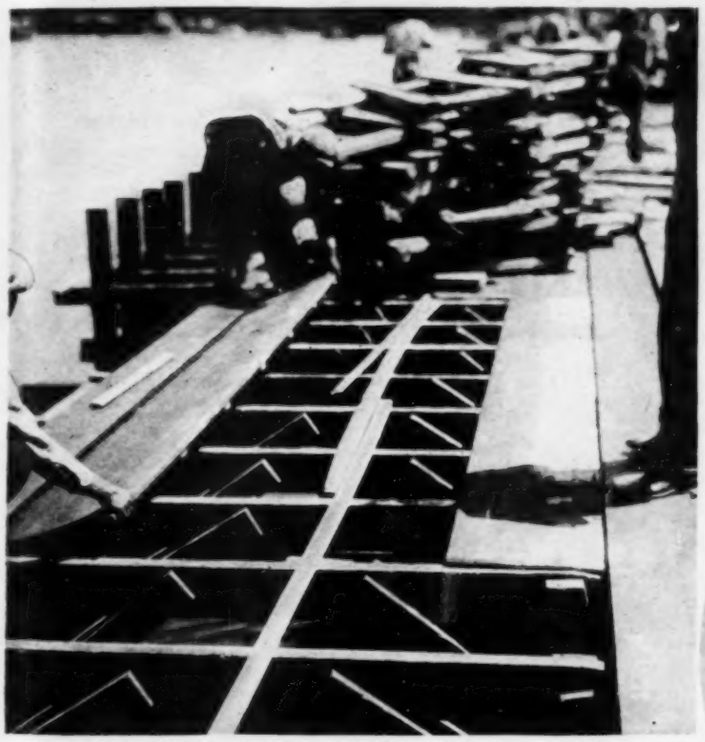


4 INSIDE JACKS *(right)*, for the interior deck forms, rest on the flanges of the I-beams. Beveled ends on the top of the jack permit form panels to be slipped under the top flanges of the I-beams.

Field Methods on I-Beam Girders

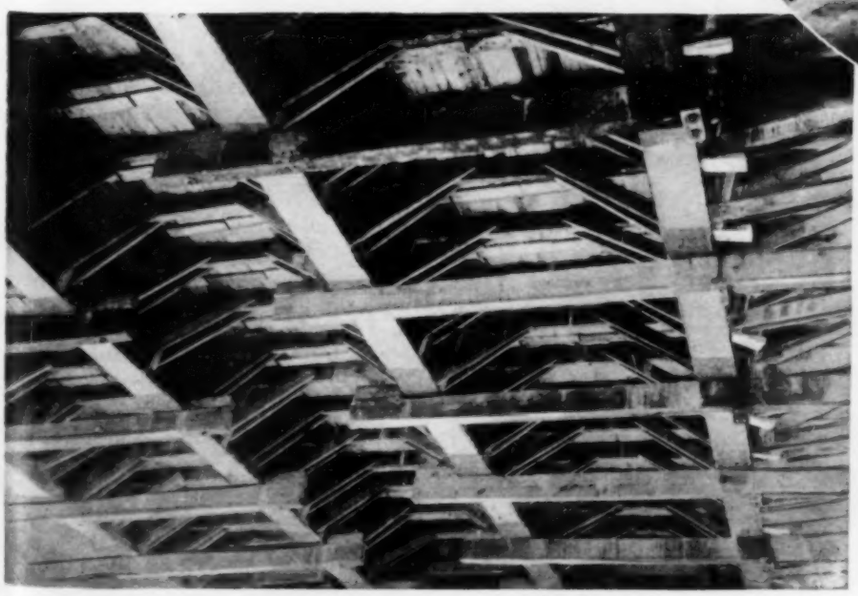
Workmen erected and stripped the simple forms quickly. Eight laborers would strip and load on barges all the forms in a 44-ft. span in 42 minutes. They first loosened the outside jacks by knocking out the wedges and then removed these jacks and the cantilever beams. With wrecking bars, they knocked down the inside jacks and allowed the panels to drop from the slab.

5 A NAILING STRIP holds the inside jacks in place temporarily.



6 DECK PANELS, 19 in.x14 ft., are laid on the jacks. Panels next to the I-beams extend under the flange.

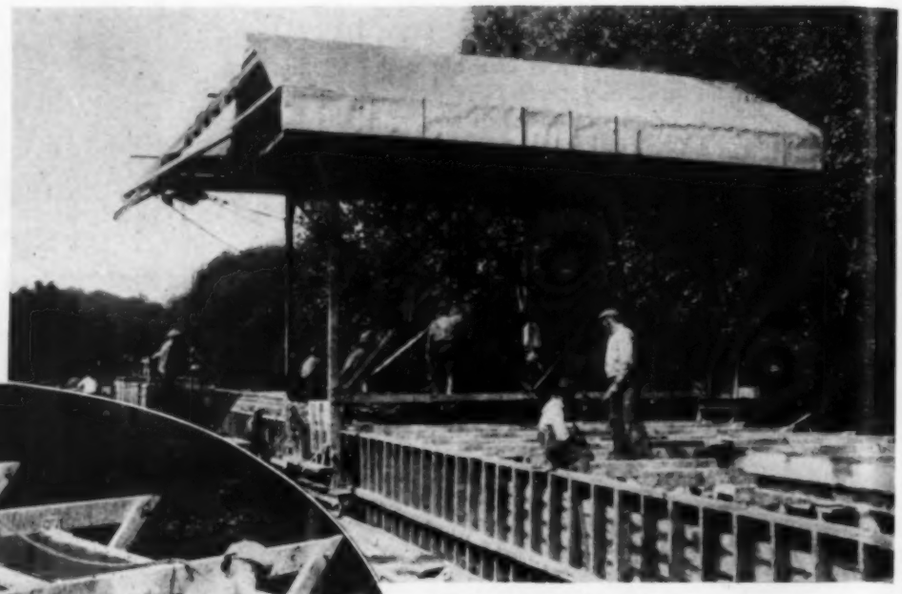
7 CURB FORMS *(above)* stand against the posts of the outside jacks.



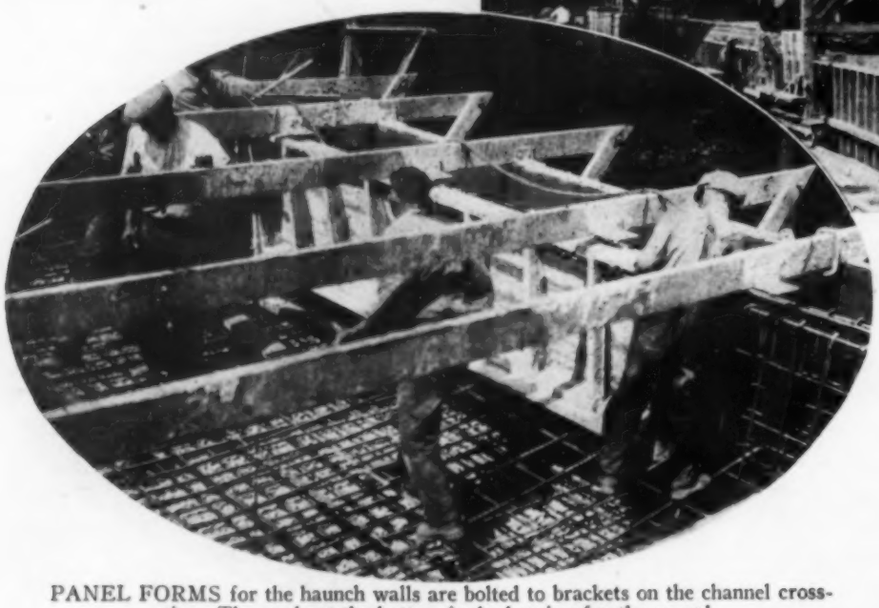
8 WEDGES *(left)* bind the outside jacks between the flanges of the I-beams. Interior jacks and panels fit tightly between the flanges of the I-beams.

Gantries Applied *to Build 4-Mile*

THREE applications of the traveling gantry were used in building the 4-mile outfall sewer from Akron, Ohio, to the city's disposal plant on the Cuyahoga River. Variation in the character of the foundation and in the materials of construction made different applications necessary on the two contract sections. A cross-section of the sewer as constructed under Contract 2 is shown on the opposite page. The T. E. McShaffrey Construction Company, Akron, built practically 8,900 ft. of this type of sewer. Contract 1, 12,680 ft. in length, held by the Holmes Construction Company, Wooster, Ohio, specified a full concrete section of practically the same dimensions, the invert paved with brick and the arch lined with vitrified clay liner plates. Nearly all of the sewer on Section 2, as well as a large part of Section 1, was carried on cast-in place concrete piles.

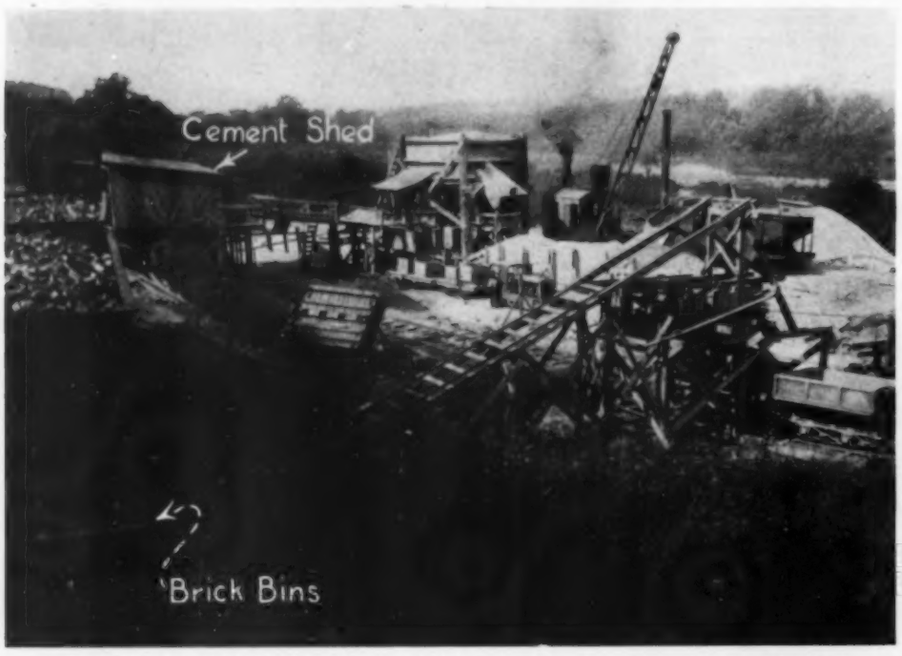


TWO TROLLEY BEAMS are mounted on this gantry traveler, which handles buckets of concrete for invert and haunch walls.



PANEL FORMS for the haunch walls are bolted to brackets on the channel cross-ties. The angle at the bottom is the bearing for the screed.

A. B. BACKHERMS, sewerage engineer, in charge of operations for the City of Akron.

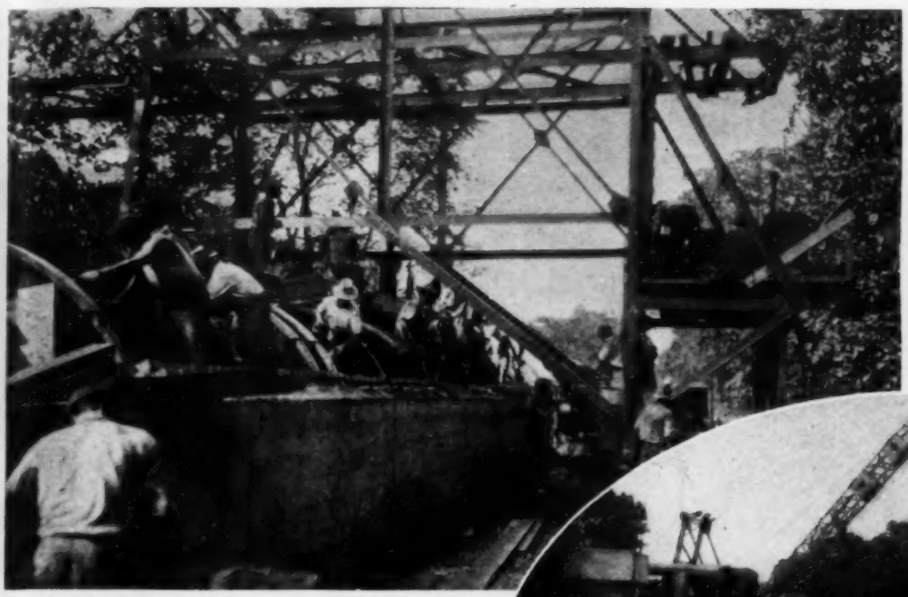


CENTRAL MIXING PLANT and brick unloading rig. Steam-operated inclined hoist takes brick from spillway of old canal, used as bins, beneath the track.

The sewer followed the old Ohio canal. It was placed either on a fill in the canal or on the tow path. In 1927 the T. E. McShaffrey Construction Company made a fill of 200,000 cu.yd. in the center of the old canal for 7,500 ft. of Section 2. Spoil was obtained from a channel change in the Cuyahoga River at the west end of the contract section and was hauled a maximum distance of 3 miles over standard gage track.

The fill was built wide enough to carry the sewer and 6-ft. ties for railroad track. In constructing the sewer, industrial railway was the only feasible

in Three Ways
Outfall Sewer



MORTAR for the arch was supplied by traveling gantry equipped with 2-bag mixer. Eleven bricklayers placed 44,000 brick in 8 hours.

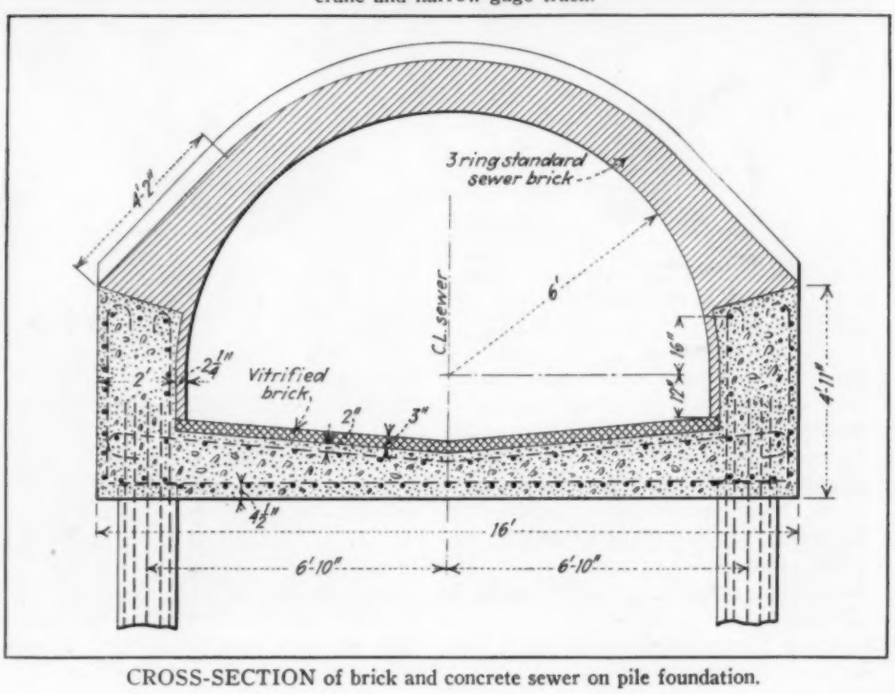
THOMAS E. McSHAFFREY, actively in charge on the job, just two days before his death.

method of distributing materials. Considerable auxiliary construction would have been needed to get trucks on and off the grade. Lack of space on the narrow fill and the large amount of reinforcing steel in the invert and haunch walls made a central mixing plant a more convenient means of producing concrete than a movable mixer.

At the west end of the job was the only place where a railroad siding could be brought into a materials yard on solid ground. A trestle would have been necessary at any other site. Track for fifty cars was laid in the yard, and a central mixing plant was equipped with a Knickerbocker 1-yd. mixer. One rail of the standard-gage track on the fill was moved in to reduce the gage to 36 in., and concrete was hauled from the mixer in 1¼ yd. Insley buckets by Plymouth 8-ton gasoline locomotives. Diatomaceous silica was added to the mix to preserve the workability.

No space to operate a crawler crane alongside the forms was available on top of the fill. The contractor needed some other means of handling the concrete buckets. He designed a traveling gantry which provided an effective method of placing the concrete. Two trolley beams mounted on the gantry extended over the track. Each beam carried a trolley block by means of which the concrete buckets were lifted off the cars. The cable from each block was wound on one of the drums of a two-drum gasoline hoist. The blocks were pulled along the beams by ropes attached to the blocks and operated on the two nigger-heads of the hoist.

DRIVING CONCRETE PILES inside puddle core cofferdam for one of four piers at Cuyahoga River crossing on Section 2. Special construction trestle for crane and narrow-gage track.



CROSS-SECTION of brick and concrete sewer on pile foundation.

This gantry handled the concrete buckets very efficiently. Another traveling gantry was designed to provide mortar for the brick arch. During the day the railway was kept busy hauling concrete. At night it was used to stock materials for the following day's work of the brick-laying crew. The night shift also moved ahead the 150 ft. of collapsible inside arch forms used in laying the brick.

The gantry which supplied the mortar was equipped with a two-bag mixer and a two-drum gasoline hoist. A trolley block was used to move the bucket, which could carry mortar or extra brick, if needed. This equipment, together with two shifts of 35 laborers for supplying materials, enabled eleven bricklayers to build a 150 ft. section, containing 44,000 bricks, in 8 hours.

Each gantry was moved ahead by means of a rope connected to a deadman in advance of the machine. The rope passed through a sheave on the frame of the gantry and was wound on the nigger-head of the hoist.

Approximately 60,000 lin.ft. of reinforced concrete piles were cast in place on Section 2 by the Western Foundation Company, Chicago, to carry the sewer until the fill would consolidate. The piles were spaced 12½ ft. apart laterally and 7½ ft. apart longitudinally. A 2½x2½x16-ft. reinforced concrete cap was placed on the piles under each expansion joint. These joints were 75 ft. apart.

METAL CLIPS hold liner plates in a solid blanket over the inside forms. The workman is attaching a plate.

GASOLINE TRAVELER moves the inside forms ahead. The forms are adjusted to position with ratchet jacks, and the aprons then are blocked by spreaders from the track.

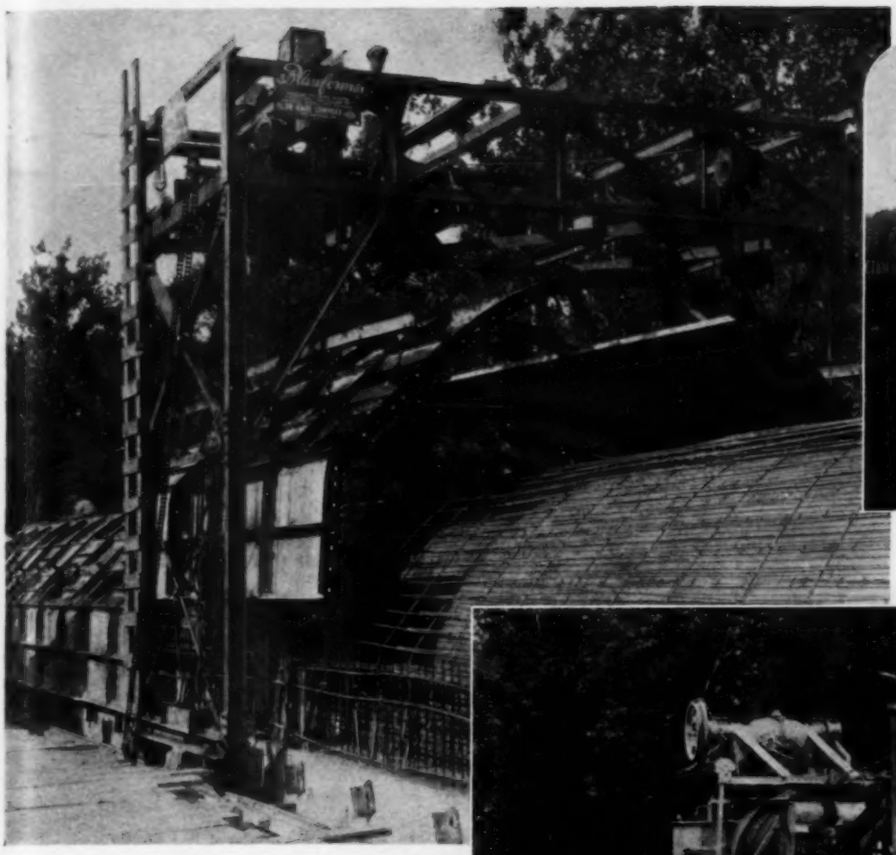
COMPLETE STORY of arch construction: inside forms, liner plates, expansion joint, reinforcing steel, gantry traveler, outside forms, plank road for trucks, paving mixer, and crane.

Thomas E. McShaffrey, head of the construction company which bears his name, maintained close personal supervision of the operations until September 12, 1928, when he suddenly died as the result of a heart attack. Arthur Helvigh, superintendent, assumed full charge of activities from the date of Mr. McShaffrey's untimely death.

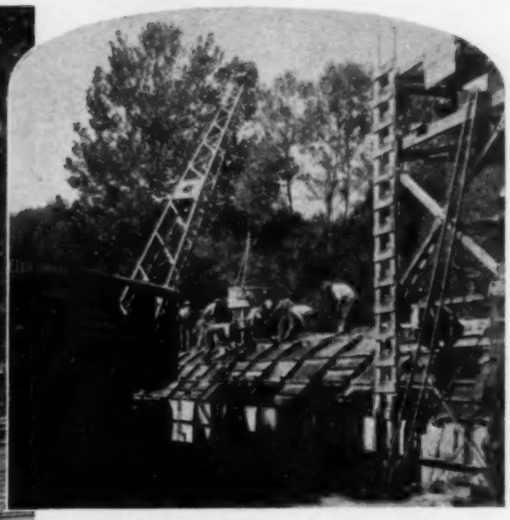
Full Concrete Sewer

The 2.4 mile concrete sewer which the Holmes Construction Company built under the terms of Contract 1 lay almost entirely on level ground. Given an abundance of level working space, the contractor on this section chose an altogether different plant set-up. Paving mixers were selected to prepare concrete for both invert and arch, and batched materials were hauled by truck from two locations of the central proportioning plant.

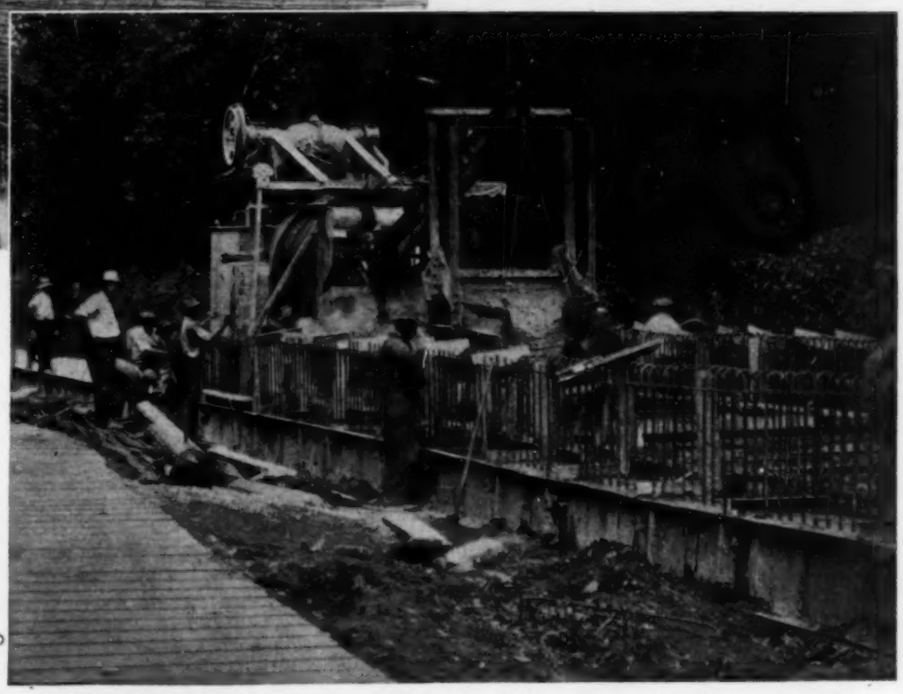
The base was constructed by the same methods used to build concrete roads. Both mixer and trucks traveled over the gravel fill subgrade. The boom of the paver was fitted with a chute extension to give steel setters 36 ft. of space behind the machine in



OUTSIDE FORMS are moved in 20-ft. sections by a traveling gantry equipped with a gasoline motor. Chain drive to both sides of gantry, but no differential, is used.



THE ARCH is poured by mixer and crane moving alongside. Ports are left open to permit spading concrete in the walls.



THE BASE is treated as a concrete paving job. Mixer and trucks travel on subgrade. Chute extension on boom allows space for steel setting.

which to place the reinforcing bars.

Collapsible inside forms for 380 ft. of arch were made in 10-ft. sections, to be moved by a gasoline traveler running on rails. The carrier traveled 760 ft. every time it moved a section, compiling a total of 200 miles on the job.

Attaching Liner Plates—A problem of the first magnitude was presented in determining a method of attaching the 275,000 clay liner plates to the inside forms. The solution was simple, effective, and economical. Small steel clips were designed to bind the plates together into a solid blanket hung over the forms. The teeth of the clips, spread by the action of coupling the liners, exerted an appreciable force in holding the plates together.

A power-driven gantry traveler moved the outside forms, which were made up in eighteen 10-ft. sections. Two units, bolted together, were handled at a time. At the insistence of the contractor, the Blaw-Knox Company, builder of the equipment, installed a gasoline motor on top of the traveler. The engine was connected, without a differential, by chain drive to the wheels on both sides of the gantry. As the machine traveled at least 60 miles in moving outside forms on the job, A. Stelhorn, chief engineer of the Holmes Construction Company, estimated that the addition of mechanical power saved $30,000.

A. STELHORN, chief engineer, manages the work for the Holmes Construction Company.

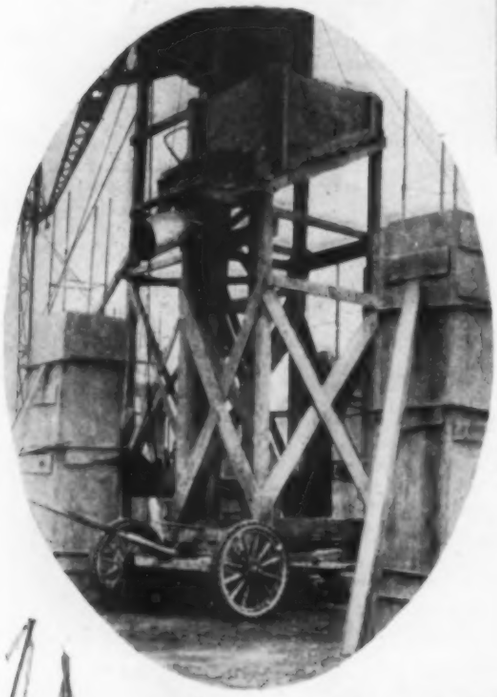
Hauling to the Mixer—When possible, in concreting the arch, the trucks hauled over the base. Because of delays resulting from pile driving, this procedure was usually obstructed, and the forms had to be moved in the direction away from the plant instead of toward it.

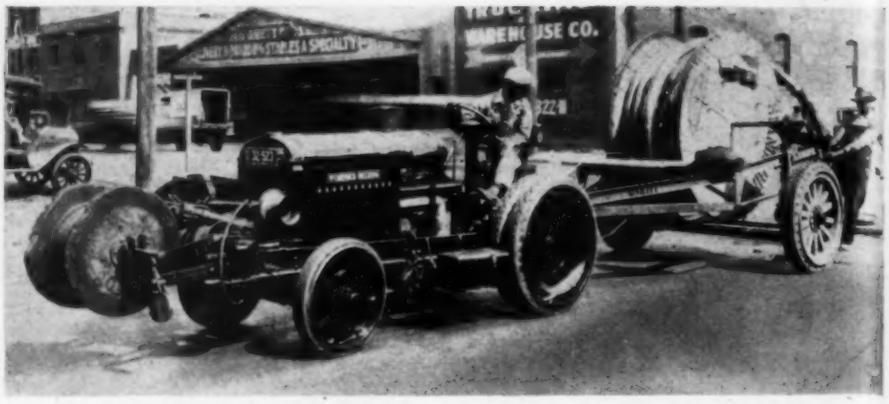
Superintendent Fred Cain, for the Holmes Construction Company, directed operations under Mr. Stelhorn. A. B. Backherms, as sewerage engineer, was in charge. He followed the plans originated by J. E. Root, who resigned January 1, 1928. F. E. Swineford, service director, exercised general supervision. A. C. Jacobs was resident engineer.

Getting Down to DETAILS

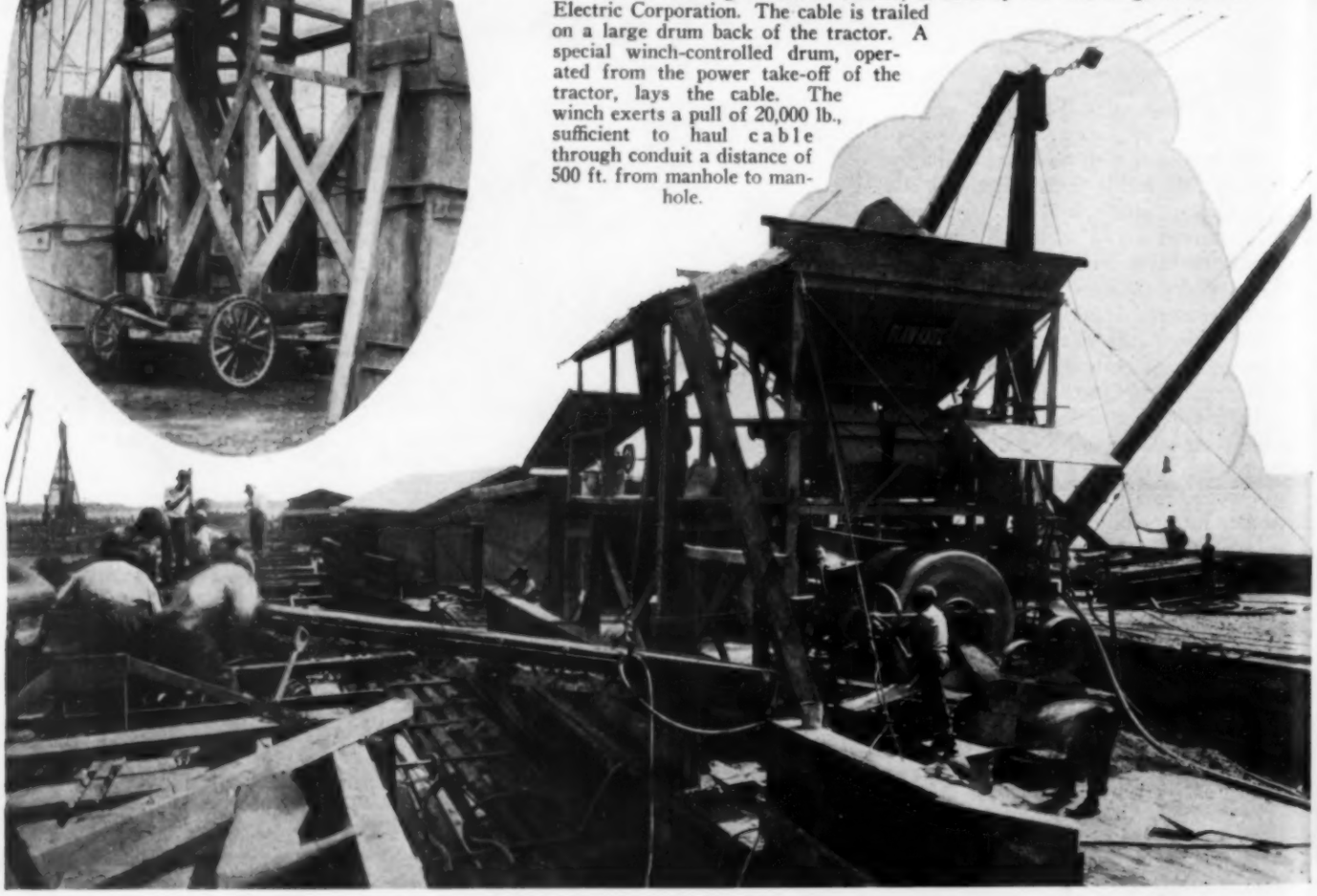
[Close-up Shots of Job Methods and Equipment]

ELEVATED HOPPER *(below)* on wheels proved a handy rig for superintendent John Willison, of the Alden Park Manor Corporation, who used it to convey concrete from tower to column forms for apartment building at Germantown, Pa. The casting of the columns separately, ahead of the floor slab, insured firm bracing of floor forms and facilitated stripping of column forms.



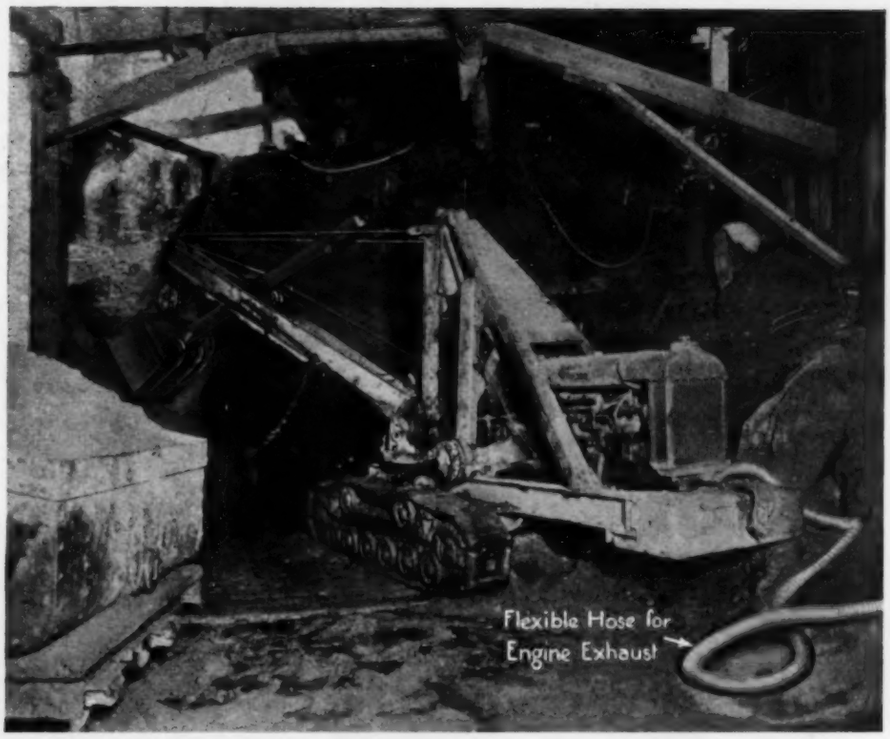


RIGGED FORE AND AFT to lay cable. This unit, built around a McCormick-Deering industrial tractor, is used by the Los Angeles Gas & Electric Corporation. The cable is trailed on a large drum back of the tractor. A special winch-controlled drum, operated from the power take-off of the tractor, lays the cable. The winch exerts a pull of 20,000 lb., sufficient to haul cable through conduit a distance of 500 ft. from manhole to manhole.



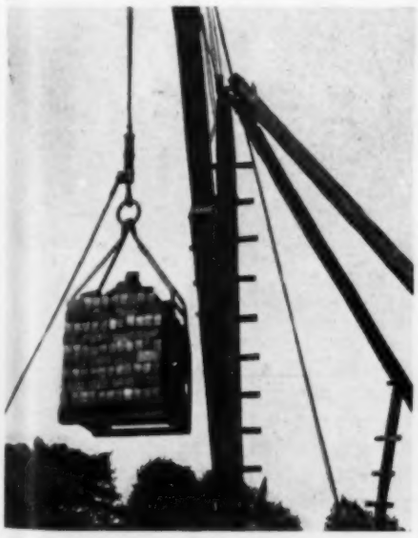
BELT CONVEYOR carries concrete from floating mixing plant to pier which Merritt-Chapman & Scott Corporation is building for the City of Baltimore. A 1-yd. mixer, batching plant, cement shed and cement elevator to mixer platform are mounted on the barge. The standard Haiss portable troughing-type conveyor, from which wheels and carriage have been removed, is suspended by an A-frame from the side of the barge. A derrick barge transfers sand and gravel by clamshell bucket from barges alongside to the bins of the mixing plant. The belt conveyor handles a 1-yd. batch of concrete on angles up to 30 deg. in 35 to 50 sec.

WOOD BLOCKING bolted to frame of truck chassis offsets overturning tendency of Universal crane with 62-ft. boom, as illustrated in this photo from Emerson Hay, superintendent for the Union Structural, Inc., of Syracuse, N. Y. He bolts two 12x12 timbers 9 ft. long to the truck chassis, and supports the timbers at each end with 12x12 blocks and wedges. This blocking gives the crane a solid bearing which enables the machine to pick up a 1½-ton load at a 22-ft. radius on a 62-ft. boom or to set 3-ton beams at an 18-ft. radius with a 40-ft. boom.



FLEXIBLE TUBING to carry exhaust gases to the street above has made it possible to use gasoline shovels for underground work on the Brooklyn subway. The Johnson Construction Corporation has been excavating clay with three of the small machines manufactured by the Universal Power Shovel Company of Detroit for several months without experiencing trouble from exhaust gases. The contractor lowered each shovel in three units with a crane. Reports state that each machine averages 225 yd. every 8 hours in clay too hard for hand digging.

TO ROLL rock asphalt paving surface of timber bridge, Mallory & Nash, Atlanta, Ga., widen rear wheels of a Fordson tractor to 18 in. and fill them with concrete, giving a pressure of 200 lb. to 1 in. of width.



PLATFORM piled with 400 brick aids transfer of pavers from barge to street at Richmond, Va. Derrick lowers platforms to hold of barge and lifts them after loading. J. E. Griffin states that this method of handling brick proved efficient.

OXYACETYLENE cutting and welding came to the aid of a constructor who found the four anchor bolts embedded 5 ft. deep in each of seven bridge piers to be several inches short. Oxyacetylene equipment offered a quick means of correcting the error. Workmen cut off the threaded portion of the bolts and bevelled the stumps to a 45-deg. angle. They then welded the extensions to the stumps and built up a ½-in. reinforcement around the bevelled joint.

Repair Bridge by ARC

WELDER *(left)* at work on one of the gusset plate connections between diagonal and top chord.

FLOOR SYSTEM repairs and replacements included renewal of top and bottom flanges of beams. New angles were welded to top and flange plate to bottom of webs.

ELECTRIC arc welding made possible extensive repairs to the C St. bridge at Bound Brook, N. J., without stopping trolley car operation over the steel structure or interfering, by shoring or other obstructions, with main line railway service underneath. The bridge, carrying a single trolley car track, an 11-ft. driveway and a footwalk on brackets, consists of two pairs of pony trusses, each 86-ft. long. Certain parts of the structure had been weakened by corrosion and required strengthening or replacement. Repair work consisted of the following operations:

1. Replacement of bottom chord and diagonals of all four trusses by new members, welded in place.
2. Reinforcement of other corroded parts of trusses.
3. Replacement of footwalk brackets and I-beams and channels carrying roadway.
4. Replacement of top and bottom flanges of corroded floor beams.

Difficulty in repairing the trusses while maintaining trolley operation was ingeniously overcome by keeping the existing latticed channels in place, cutting enough of the lacing to permit entry of new Carnegie H-sections, then inserting the new members and welding them to existing gusset plates.

After burning all lattice bars from the bottom of the lower chord, new members were slid between the top and bottom batten plates near the end joints. While they were held by temporary bars, welded under the chords near the splice, the new chords were fastened to the gusset plates and the chord splices made. Web members were similarly erected. In welding web members, the upper end was welded first and traffic was stopped during the welding of the lower end.

In renewing top and bottom flanges of floor beams an auxiliary 18-in. I-beam was placed alongside under the track

NEW STEEL DIAGONAL member inserted within old channel after burning out lattice bars.

stringers to carry the load while the flanges were being removed. New angles were welded to the top and a flange plate was welded to the bottom of the webs of the existing floor beams.

After the auxiliary beam had been removed, new diagonal brace rods were welded to the top flange of the bottom chord.

All welding was done in the field by William Norberg and two assistants

Under Traffic
WELDING

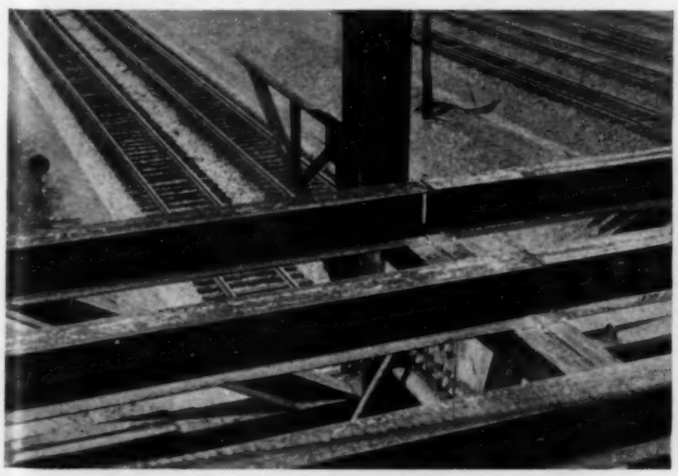
SPLICES in new bottom chord and web member.

TOP CHORD DETAIL showing welded connection between new diagonal members and existing gusset plate.

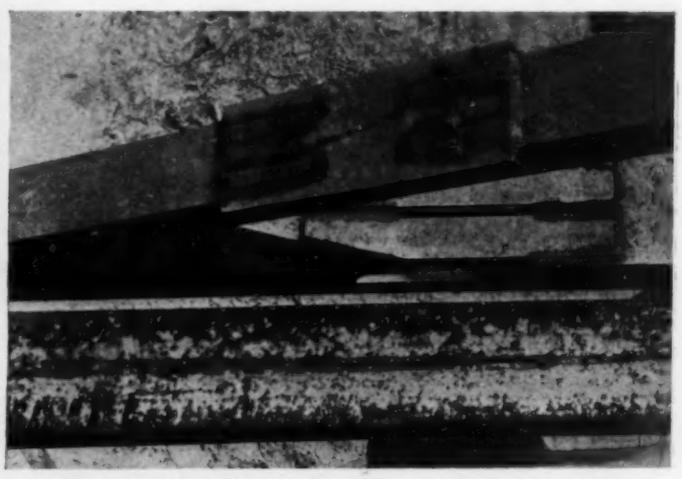
ONLY HALF of the floor system was repaired at one time, to permit uninterrupted trolley car service on other half of structure.

loaned by the Westinghouse Electric & Manufacturing Company, using three Westinghouse motor-generator welding sets with a 200-amp. rating and 550-volt direct-current motors supplied from the trolley feed wire. The stub arms of the web members and plate stiffeners were assembled and welded to the middle section of the bottom chord on the deck of the bridge before erection. The channel plates of the upper arms of the web members were similarly welded. Two kinds of welds were used, $\frac{3}{8}$-in. fillets and slot welds.

The work was carried out by the Public Service Coordinated Transport under the direction of L. B. Woodruff, construction engineer, using one of the company's regular bridge gangs. Martin White was superintendent, maintenance of way, and George H. Haldeman engineer, maintenance of way. The work was laid out and designed by Gilbert D. Fish, consulting engineer on structural welding.

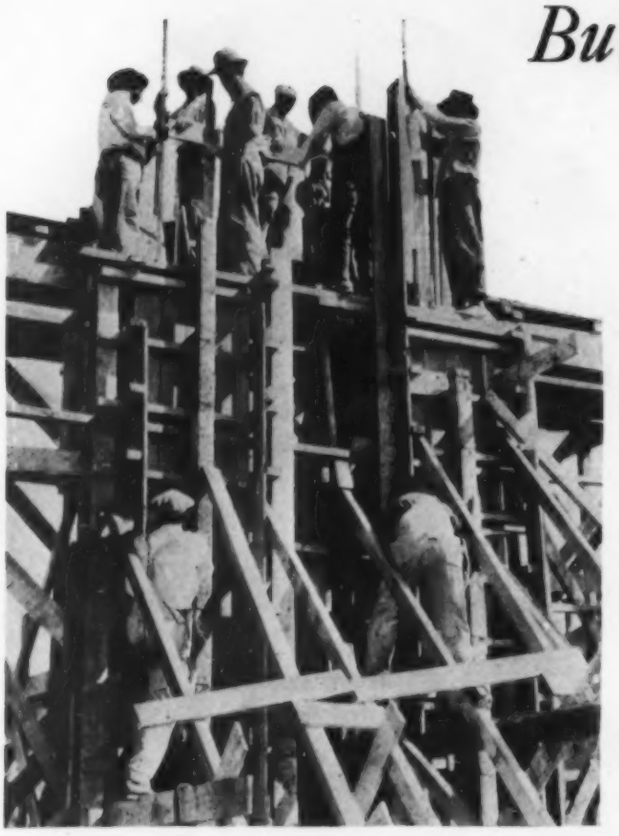


RECONSTRUCTED FLOOR BEAM with steel I-beam stringers welded in place. Note sidewalk bracket at rear.



SLOT WELD DETAIL at splice in diagonal member near connection with bottom chord. Other welds used fillets.

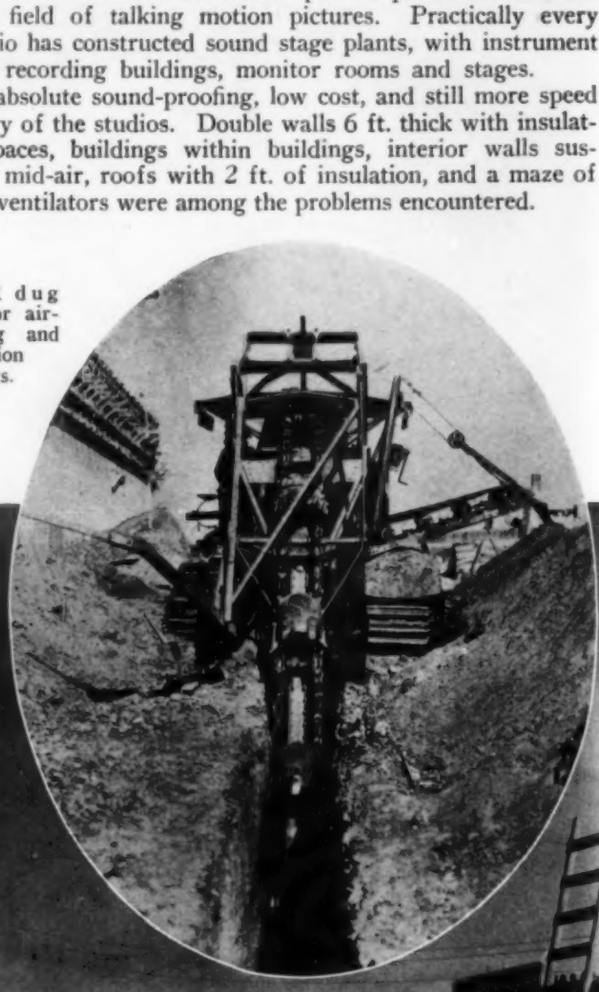
Building a VOICE *into the Movies*



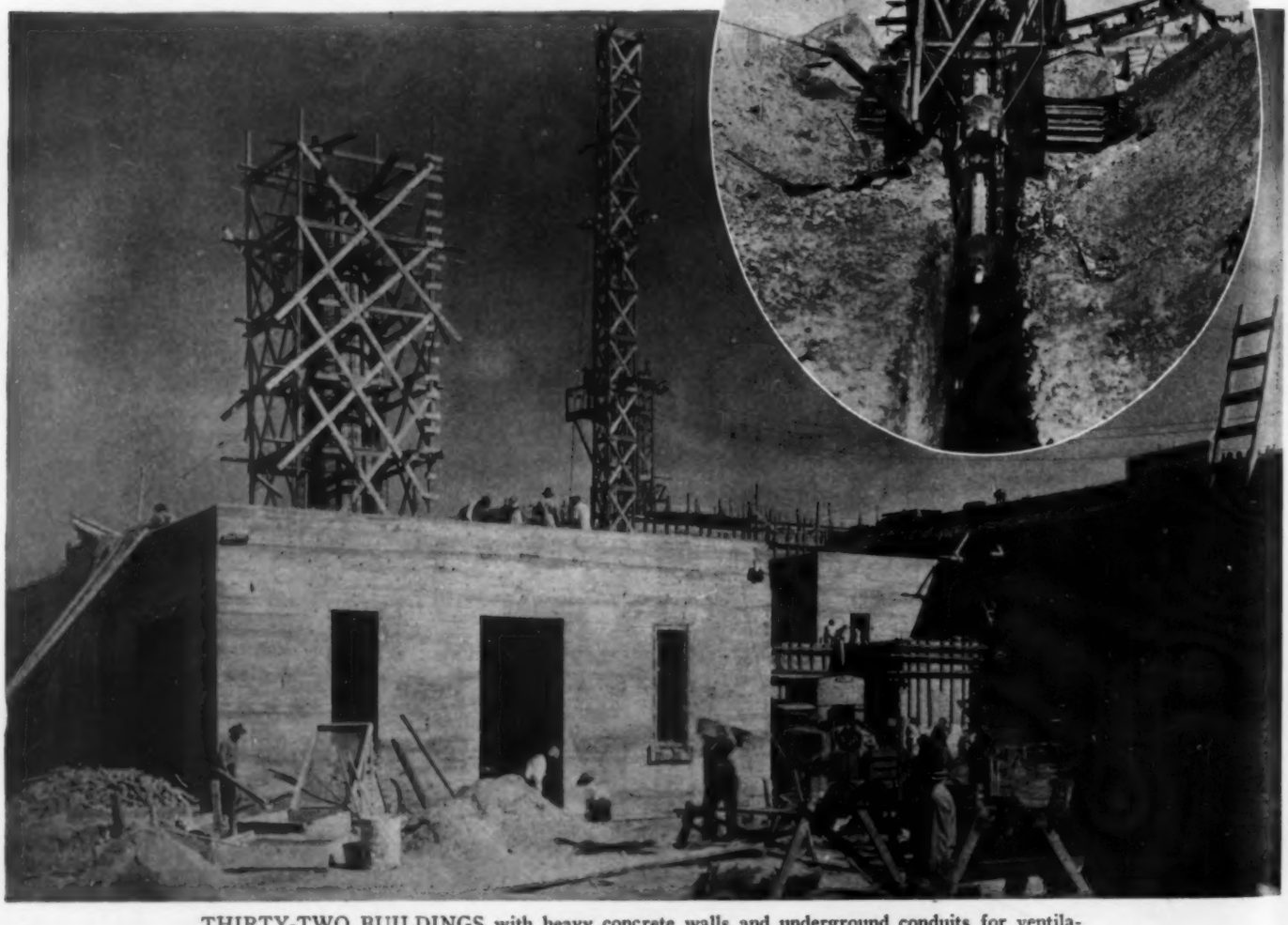
MAN POWER on the concrete form work for the Fox sound stages was increased to meet the insistent demand for speed, and still more speed, in construction

A NEW FIELD of construction has been opened in California in the rush of motion picture producers to enter the field of talking motion pictures. Practically every large studio has constructed sound stage plants, with instrument buildings, recording buildings, monitor rooms and stages.

Speed, absolute sound-proofing, low cost, and still more speed was the cry of the studios. Double walls 6 ft. thick with insulating air spaces, buildings within buildings, interior walls suspended in mid-air, roofs with 2 ft. of insulation, and a maze of wires and ventilators were among the problems encountered.



DITCHER dug trenches for air-conditioning and ventilation conduits.



THIRTY-TWO BUILDINGS with heavy concrete walls and underground conduits for ventilation were rushed to completion for the Fox plant.

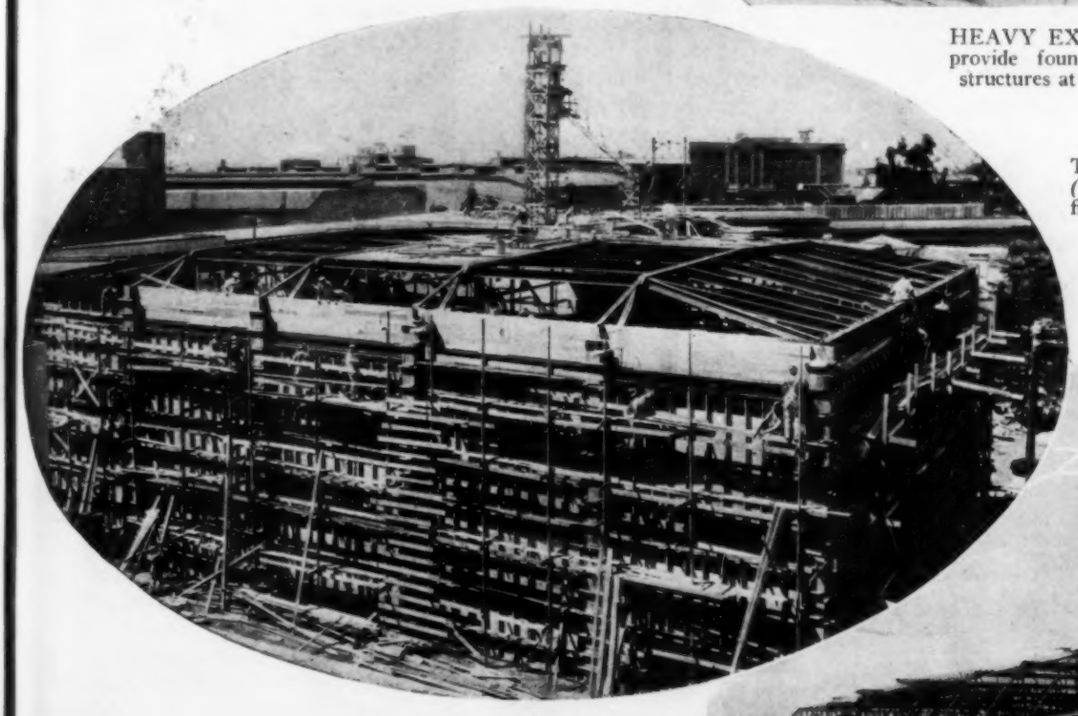
To meet the demands of the studios the maximum number of men and the greatest amount of equipment that could be used advantageously in speeding up the work were put on the job in each case.

The new Fox sound stage plant employed 2,000 men in three shifts, seven days a week. The plant, which consists of 32 structures, was completed in 90 days. In excavating 400,000 cu.yd. of earth seven large power shovels, four small shovels, four clamshells, a ditcher, fifty 5-ton dump trucks and twelve 1-ton Ford trucks were in continuous operation. Twelve mixers were used on the concrete work. A crane with a 100-ft. mast placed nine 80-ft. steel truss spans weighing 9½ tons.

Underground construction for ventilation of the sealed sound-proof structures included a 9x6-ft. concrete main conduit with a number of smaller ducts leading off to the various buildings. Two concrete water tanks, one overhead and one 25 ft. under the ground, were used in the air conditioning. The design and construction of the entire plant were under the supervision of Keith Weeks.

At the Warner Brothers studio, where several stages have been constructed, 200 construction men were allotted to a stage. The largest of these is 200x300 ft. Lewis Gieb was engineer and Col. Nungent S. Slaughter was in charge of construction.

HEAVY EXCAVATION was required to provide foundations for new sound-proof structures at the Warner Brothers Studios.

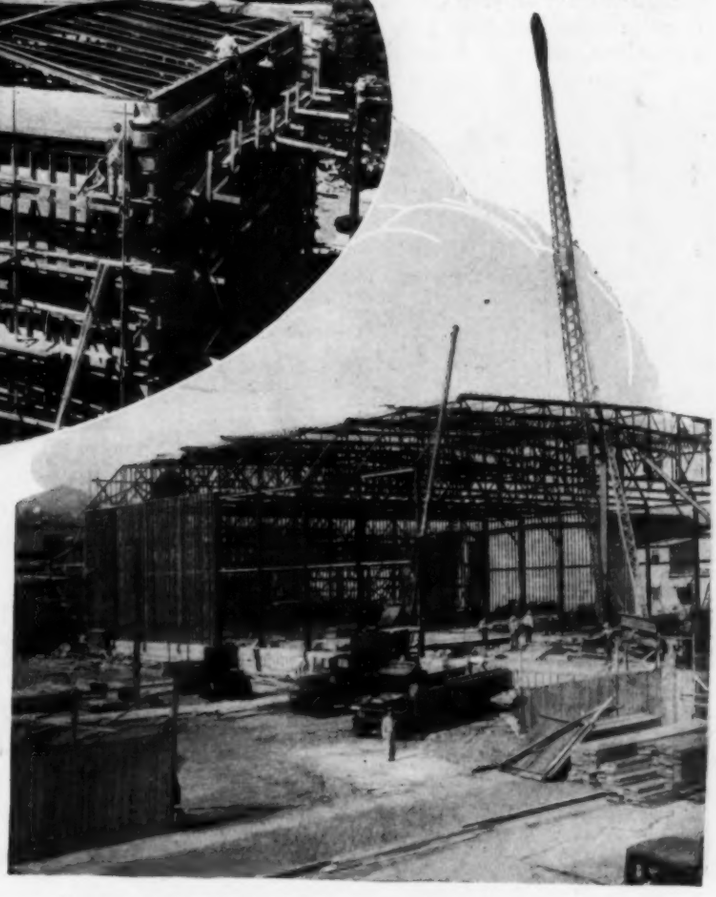


THREE 8-HOUR SHIFTS *(left)* worked continuously to finish this large structure for Metro-Goldwyn-Mayer.

The sound stages at Metro-Goldwyn-Mayer, worked in three 8-hour shifts, seven days a week, employed 200 men. Scofield-Twaits Company of Los Angeles was the contractor.

The sound stages for Christie were constructed by the Austin Co. of California on a single shift, but nearly three times the usual field force was put on the job. The same was true of the Universal Studio job also constructed by that company. At the Paramount Studios another large force is employed on the two-story proving building 40x105 ft. and the recording stage 65x94 ft. The structural steel is being done by the Union Iron Works.

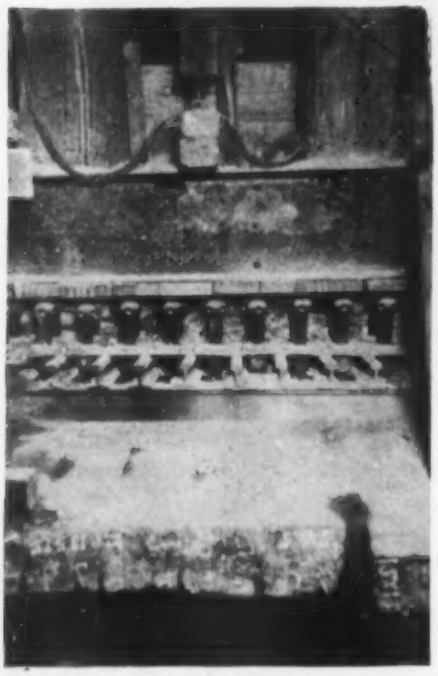
Scofield-Twaits Company also is rushing the First National Studios, while the Mack Sennett studio force is pushing construction on their sound plant.



STEEL TRUSSES for Warner sound stage were set by stiff-leg derrick and truck-mounted crane with boom extension.

Building, Age 40,

Needle Beams Support Wall Columns Replace



FOUNDATIONS for the line of shores on either side of the wall consist of 12x12 blocks 6 ft. long laid with one end resting on the wall footing.

SHORING up an eight story building to substitute steel columns and girders for the large masonry piers supporting the exterior walls was the unusual job which the John Eichleay Jr. Company of Pittsburgh performed recently. The 40-year-old Granite Building, subject of these alterations, occupies a location at one of Pittsburgh's busiest corners. The first floor had been designed originally for a bank. It was entirely unsuited for the store rooms into which the space had been converted after the bank ceased operating.

The first story had a ceiling about 30 ft. high, and its two outside walls were made up of great masonry piers, 4 ft. thick and 5 to 8 ft. long, which formed the buttresses for the window arches at the second floor line. Another bad feature of the first story was the level of the floor—18 in. above the sidewalk. To make the first story desirable for store rooms and thus restore the building to the rental value warranted by its location, it was necessary either to wreck and replace the entire structure or to shore up the top six floors and remodel the first story, installing slender steel columns in place of the massive piers, lowering the main floor to the level of the sidewalk, and adding a floor between the sidewalk level and the old second floor line.

The second plan was decided upon, and the John Eichleay Jr. Company contracted to perform the work of shoring and altering the building. That the shoring sustained a heavy load during removal of the piers and placing of the columns and girders may be judged from the load of 700 tons which one of the new columns, spaced in 17-ft. bays, carries. The building is a wall-bearing structure, 30x103 ft. in plan, with very heavy granite and stone walls. Floors of terra cotta flat arch construction are carried by heavy steel girders on about 20-ft. centers, into which 12-in. steel beams are framed.

© Trinity Court

BEFORE the recent alterations, massive piers and a high ceiling made the first floor of the Granite Building undesirable for store rooms.

A ROW of 20x20 upright timbers on each side of the walls shore up the structure during alterations. The timbers rest on 24-in. I-beams which are supported by a double line of 20-ton jack screws carried on cross blocks of 3-ft. rail lengths.

Construction Steps—The construction program resolved itself into a number of necessary steps:

1. Providing a combination barricade and scaffold which would permit the movement of heavy materials into and out of the building without endangering pedestrians or delaying traffic.

2. Devising a shoring system which would support the walls and allow girders to be inserted in the walls at

Has Face "Lifted"

and Girders While New Steel Old Masonry Piers

© Trinity Court

AFTER the substitution of steel columns for masonry piers, shopkeepers have all the window space they need. Extra strong increased area.

the old second floor line. The shores then had to carry the girders and the wall load while the piers were demolished, column foundations prepared, and steel columns placed.

3. Placing columns solidly against the girders to prevent settlement when the shoring was removed.

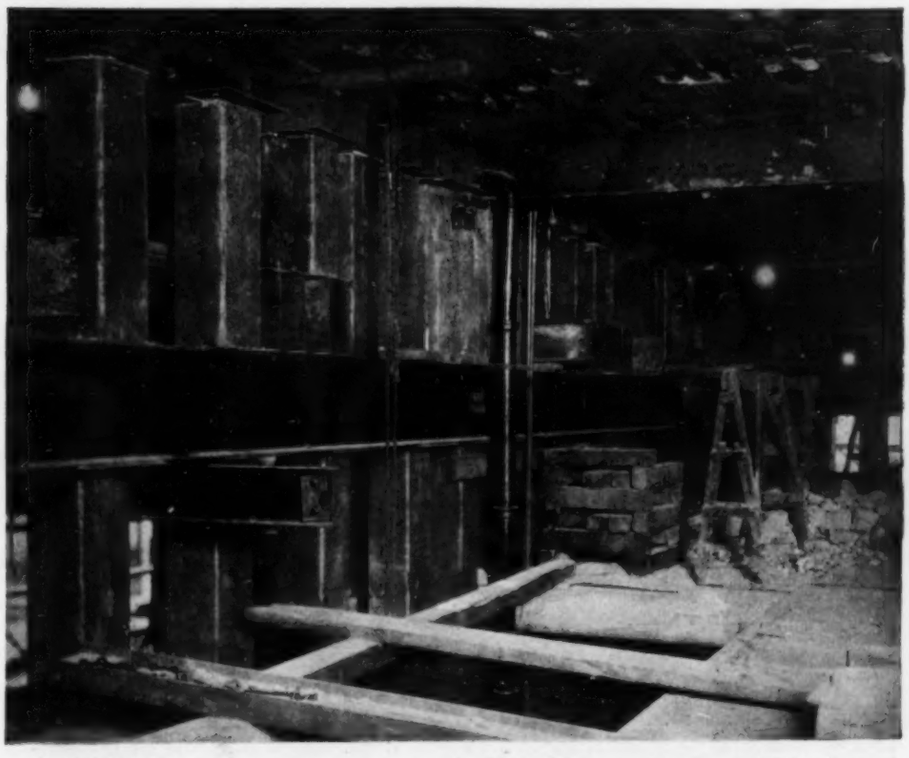
Scaffold — The contractor erected over the sidewalk a double-deck scaffold composed of steel towers as its principal units. This structure provided sidewalk protection, storage space, working platforms, and facilities for handling heavy shoring materials, steel and stone. The towers were 8 ft. square and were made up of 4x4 angle posts with 3x3 angle bracing. They required only three sizes of members. The towers could be erected quickly, spaced as desired, and increased in height when necessary. Channels bolted to the posts carried floors for overhead protection and for the working platform at the old second floor line.

Steel trolley beams suspended on the structure at convenient intervals facilitated the loading and unloading of trucks and the moving of heavy materials across the scaffold. Shoring and steel passed into the building and old stone blocks moved out while pedestrian traffic flowed uninterruptedly beneath the structure.

Shoring System — The shoring arrangement permitted the insertion of steel girders in the walls at the old second floor line prior to removal of the piers and installation of the columns. A double system of needle beams at the second floor level, supported by a line of posts on each side of the wall, made this operation possible. The lower tier of needle beams passed through the large arches of the windows, while the upper tier pierced the wall just under the old second floor. Sufficient space was left between the two rows of needle beams to allow insertion of the 30-in. girders. Screw jacks brought the shores into bearing against the needle beams.

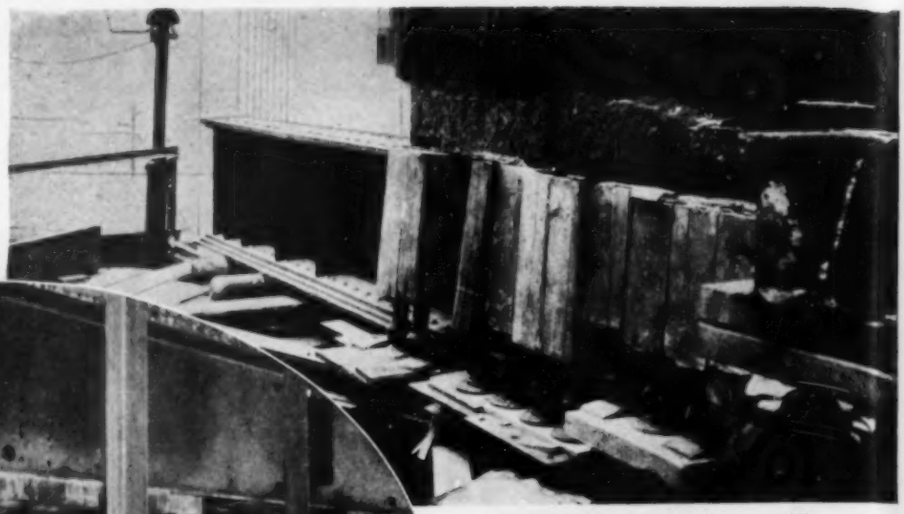
NEEDLE BEAMS above the permanent girders are burned off (as indicated by arrow) after the steel columns have been placed and wedged.

To prepare the foundations for a double line of 20-ton screw jacks on each side of the wall, workmen laid 12x12 timbers resting on the old footings and extending back 6 ft. under the sidewalk or into the basement. On top of the 12x12 timbers, they placed three lines of 24-in. I-beams. Lengths of

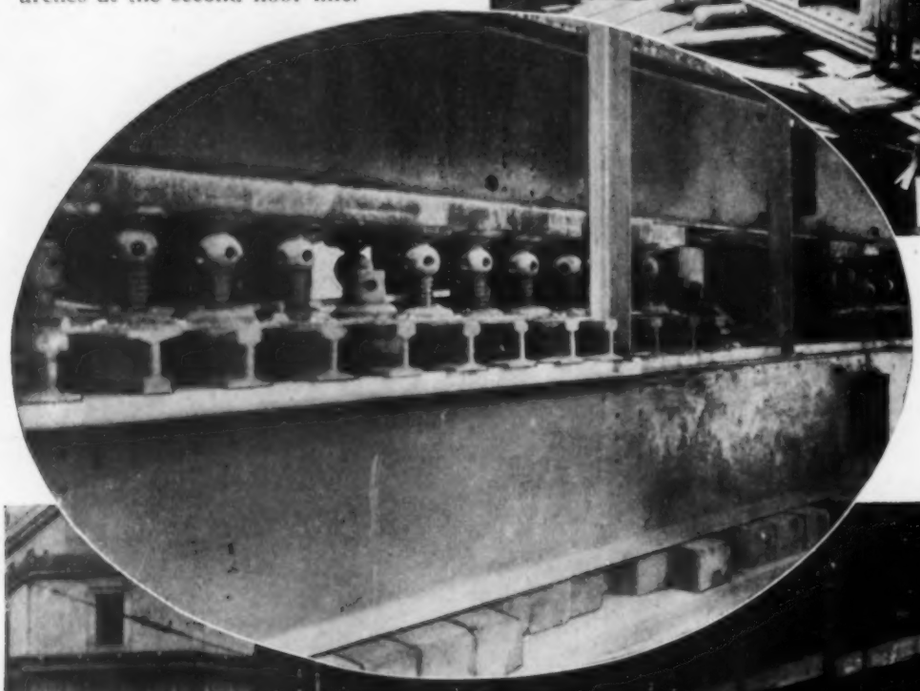


TWO TIERS of needle beams rest on the 24-in. I-beam stringers carried by the upright timbers. The 12-in. I-beam needles just under the old second floor, support the wall while the girders are being placed and underpinned. The lower row of 24-in. needle beams, extending through the window arches, carries the girders while the columns are being installed.

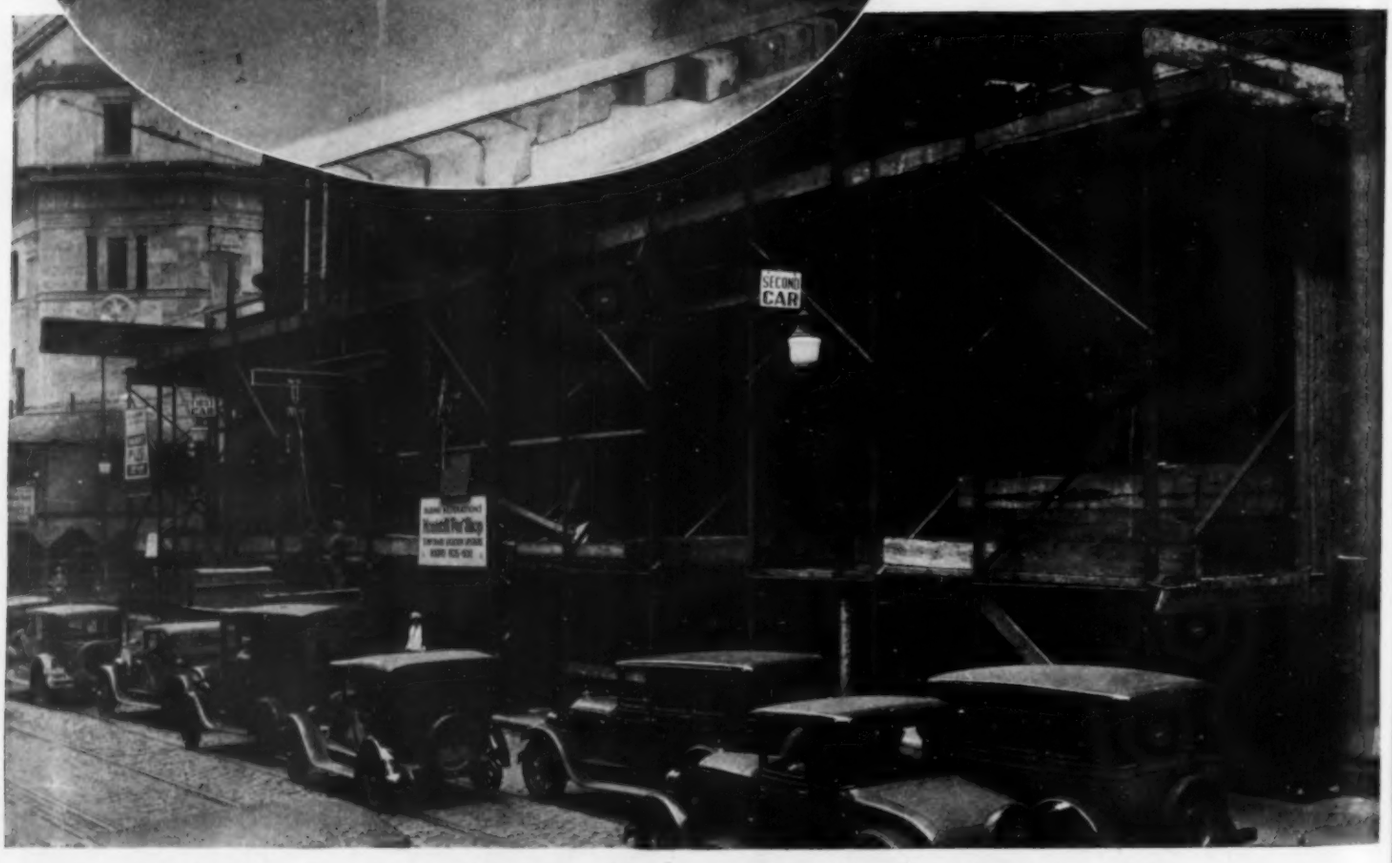
steel rail were laid across these I-beams to support two rows of house-moving jacks. The jacks carried a pair of 24-in. I-beams, which acted as a base for the row of 20x20 upright timbers. On top of the timbers another pair of 24-in. I-beams served as stringers for the 24-in. I-beam needles inserted through the large window arches at the second floor line.



ROLLING girder into position at a corner of the building. Blocks and screw jacks support the wall here, where no needle beams are installed above the permanent girders.



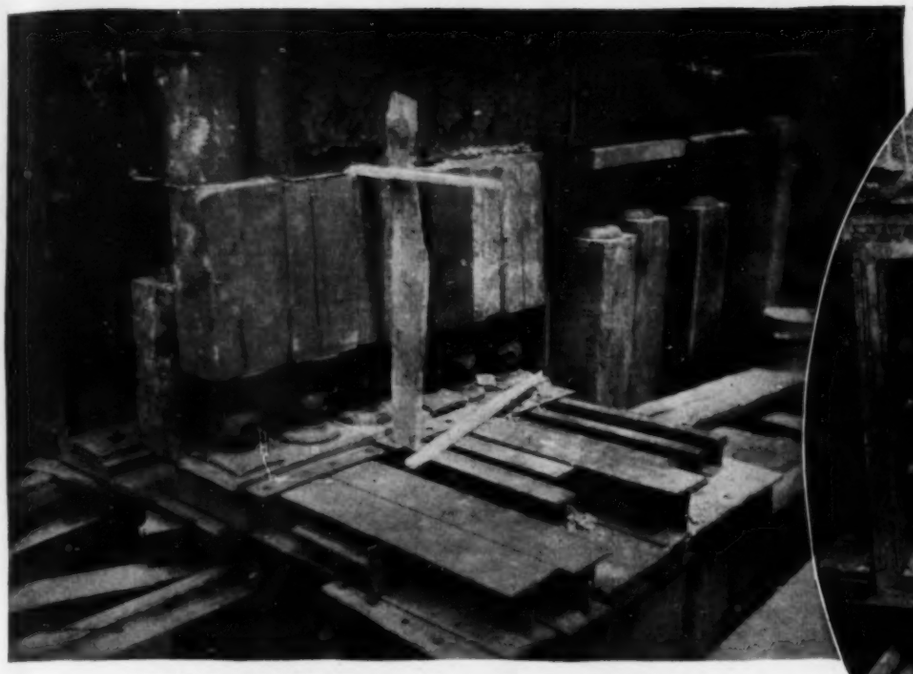
SHORT BLOCKS form the foundation for shores on sidewalk outside the walls. Angle posts of the scaffold rest on the I-beams.



SCAFFOLD composed of steel towers spaced as desired affords sidewalk protection, working platforms, and storage space. The trolley beams suspended at intervals along the structure load and unload trucks and move heavy materials into and out of the building.

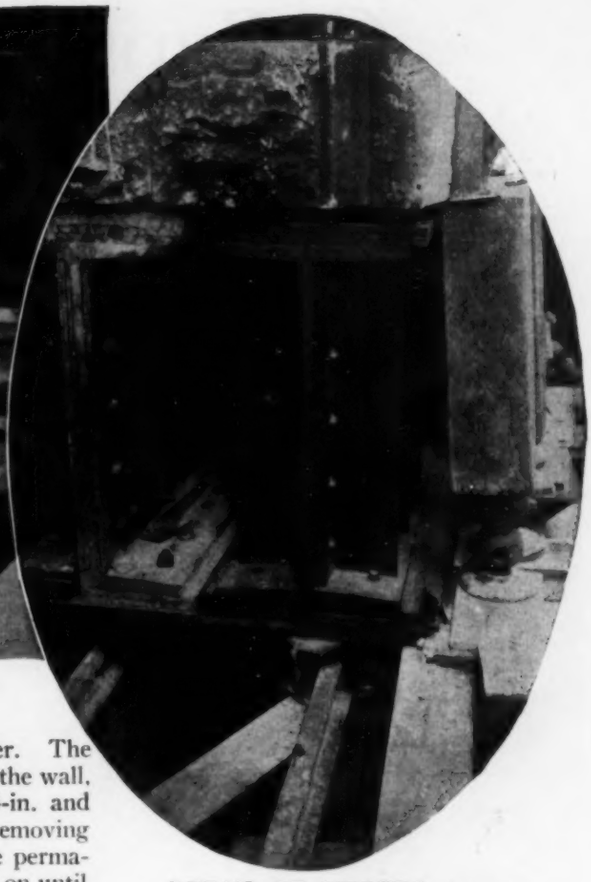
The top of this lower row of needle beams was about 3 in. below the bottom of the new permanent girders to be put in place. These needle beams were to support the new girders while they were being underpinned. Between the top of the permanent girders and the old second floor it was impossible to use an I-beam needle over 12 in. deep. Needle beams of this depth were inserted through the wall just below the second floor line and were blocked up with 20x20 timbers from the stringers and needle beams below.

With the 12-in. needle beams in place, the contractor proceeded to cut out sections of the granite wall between the tiers of needle beams and to install jacks between the upper and lower beams. Plans called for a pair of permanent girders in the wall. After pre-

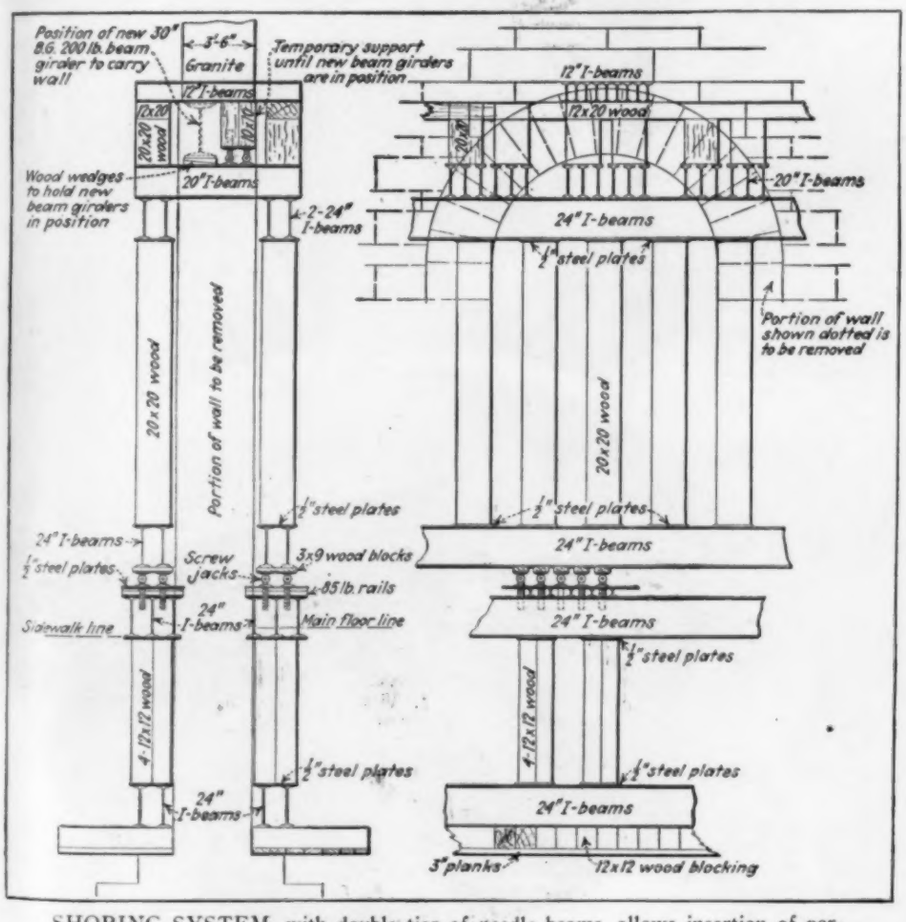


SPECIAL SHORING carried the granite wall at the corner of the building.

paring a clean span for a bay of 17 ft., workmen removed enough jacks to allow the insertion of one girder. They wedged this girder solidly from the 24-in. I-beam needles underneath, removed the remaining jacks and placed and wedged the second girder. The process of cutting out parts of the wall, placing jacks between the 24-in. and 12-in. needle beams, and then removing jacks to allow insertion of the permanent girders one at a time went on until all of the 30-in. girders were in place.



DETAIL OF GIRDERS at corner. Flanges of beam at left are notched to permit webs of abutting girders to come in contact.



SHORING SYSTEM, with double tier of needle beams, allows insertion of permanent girders and supports wall and girders while slender columns replace massive masonry piers. The photographs and article indicate that the plan is modified to suit conditions on the job.

Column Foundations — With the girders in place and securely wedged, removal of the large piers and preparation of the foundations for the permanent columns began. I-beam grillages 13 ft. long, placed in blocks of quick-setting concrete, formed the column foundations. A steel slab base 4 ft. square and 7 in. thick was laid on the grillage to afford a bearing for the column.

By driving wedges under the bases of the 14-in. Bethlehem columns, the contractor brought the columns into full bearing against the girders and forestalled any possible settlement or give in the foundations. The wedges were planed on both sides and were made about 3 ft. 6 in. long by 3 in. wide. Milling the bottoms of the columns on a slope of $\frac{1}{8}$ in. per ft. allowed driving of the wedges.

All operations were performed under the direction of J. P. Eichleay, president of the John Eichleay Jr. Company. In charge of the work of their own departments were Emil Dauenhauer, shoring engineer, and Ernest Niedeberger, steel engineer. Theodore Eichholz, Pittsburgh, was in charge of architectural design. The work was completed without settlement or other injury to the building.

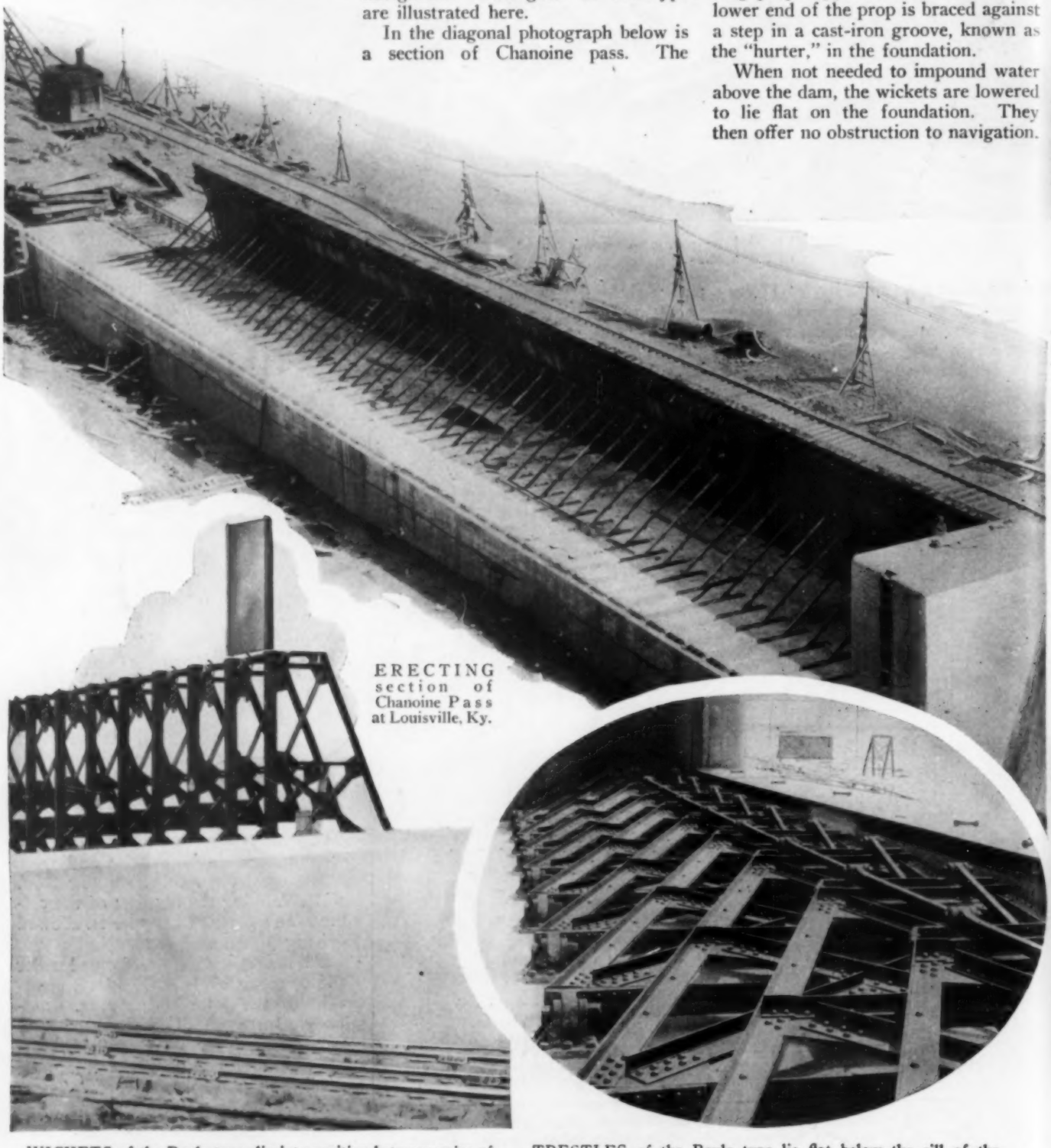
Collapsible Crest Gates

Fold Up in Flood Season

DAMS erected to serve the needs of navigation on inland rivers usually are unnecessary in periods of high water. For this reason they are equipped with crest gates which can be lowered or removed entirely when their presence would be more of a hindrance than a help to navigation. Two gates of this type are illustrated here.

In the diagonal photograph below is a section of Chanoine pass. The Chanoine wickets are in reality heavy timber shutters pivoted on a frame, called a "horse," which, in turn, is pivoted on the concrete foundation. A long prop supports the "horse." The lower end of the prop is braced against a step in a cast-iron groove, known as the "hurter," in the foundation.

When not needed to impound water above the dam, the wickets are lowered to lie flat on the foundation. They then offer no obstruction to navigation.



ERECTING section of Chanoine Pass at Louisville, Ky.

WICKETS of the Boule type slip into position between pairs of steel trestles. Floating derricks install and remove the wickets.

TRESTLES of the Boule type lie flat below the sill of the foundation after the wickets have been removed.

Present and Accounted For —

A Page of Personalities

They've Won Their Service Stripes

HERE'S a group of field men who have records of long service with the Turner Construction Co. Reading from left to right, their names and the dates of their joining the company are: Michael Gianchetta, iron worker foreman on reinforcement (1914); James Brownlie, cement mason foreman (1911); G. E. Larson, superintendent (1906); Swen E. Benson, carpenter foreman (1912); Andy Amundsen (1907).

In sending *Construction Methods* the picture of this group of veterans, P. A. Phillips, the Turner company's contract engineer, says: "The average length of service for the five men is 18 years, 5 months They were together on the construction of the North Station Industrial Building, Boston."

Are there any veterans in YOUR construction organization? The Editor wants a snapshot of them.

She's a Real Contractor

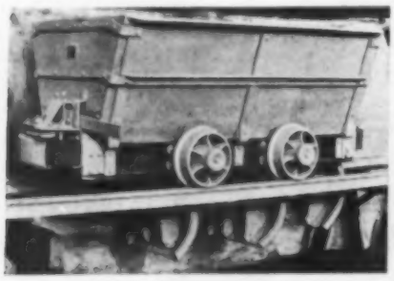
We take pleasure in presenting you to Miss Helen Robertson, contractor, of Madison, S. D., and member of the Associated Contractors of South Dakota. She took complete charge of the construction of the $90,000 Catholic School, at Madison, during the recent illness of her father, James Robertson.

BUILDERS OF COOLIDGE DAM on the San Carlos project in Arizona, (see p. 14) recently completed by Atkinson, Kier Bros., Spicer Co. *(left to right)* (1) Elmer Kier, contractor. (2) H. C. Neuffer, designing engineer. (3) C. H. Southworth, resident engineer. (4) Major-General W. C. Langfitt, consulting engineer. (5) A. J. Wiley, consulting engineer. (6) Louis C. Hill, consulting engineer. (7) Major C. R. Olberg, supervising engineer. (8) W. M. Reed, assistant chief engineer. (9) Lynn Atkinson, contractor. (10) J. G. Tripp, general superintendent.

NEW EQUIPMENT ON THE JOB

Automatic Dump Car

The Sanford-Day Iron Works, Inc., Knoxville, Tenn., supplied automatic drop bottom cars to the Mason & Hanger Company, Inc., building the



subway tunnel under the East River, New York City. These cars dump automatically while in motion. A device alongside the track trips the latch lever which holds the overlapping bottom doors closed. As the doors reach the end of the dumping pit a special knuckle automatically closes and latches them.

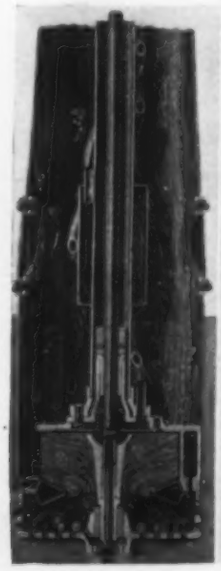
To Set Core Drill Bits

A substitute for black diamonds in setting core drill bits used in soft sandstone, soft limestone, shale and other relatively soft sedimentary strata has

been developed by the Sullivan Machinery Company, Chicago. In these soft rocks, lower first cost of the substitute, Sulamite, more than offsets slower drilling progress and higher labor cost per foot drilled. Sulamite is furnished in cubes and octagonal pieces to fit the sizes of bits in ordinary use. It is not so hard as black diamonds but is considerably harder than emery, corundum, and similar substances. The new product is not recommended for drilling in igneous rock, or in hard sedimentary or metamorphic formations.

Self-Priming Pump

The Johnson Motor Company of Waukegan, Ill., announces a portable, self-priming pump which keeps its impeller submerged as long as there is any water to be pumped. The four-bladed impeller is placed at the bottom of a shaft which is supplied in lengths of 8, 11, and 14 ft. Weights of the three sizes are 85, 92, and 99 lb.; their pumping



capacities vary from 195 to 175 g.p.m. The impeller is connected by drive shaft to a two-cylinder gasoline engine at the top of the casing. A special pressure-vacuum cooling system of circulating fresh water and an automatic motor shut-off insure the engine against damage from overheating or burning out.

New Sullivan Executive

The Board of Directors of the Sullivan Machinery Company has elected Arthur E. Blackwood president of the company, succeeding Frederick K. Copeland, deceased.

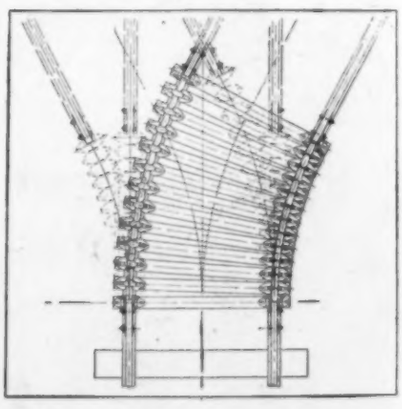
To Consolidate Concrete

An electric vibrator for use on all types of concrete work is announced by the Electric Tamper & Equipment Company, Chicago. The machine can

be adapted for any kind of concrete construction by attaching the proper foot block. When consolidating mass concrete, a broad foot block and two-man handle are used with the vibrator.

Flexible Track

The Clarkson Flexible Rail, manufactured by the Illinois Power Shovel Company, Nashville, Ill., makes it possible to cover a wide area with a single track. The flexible rail may be



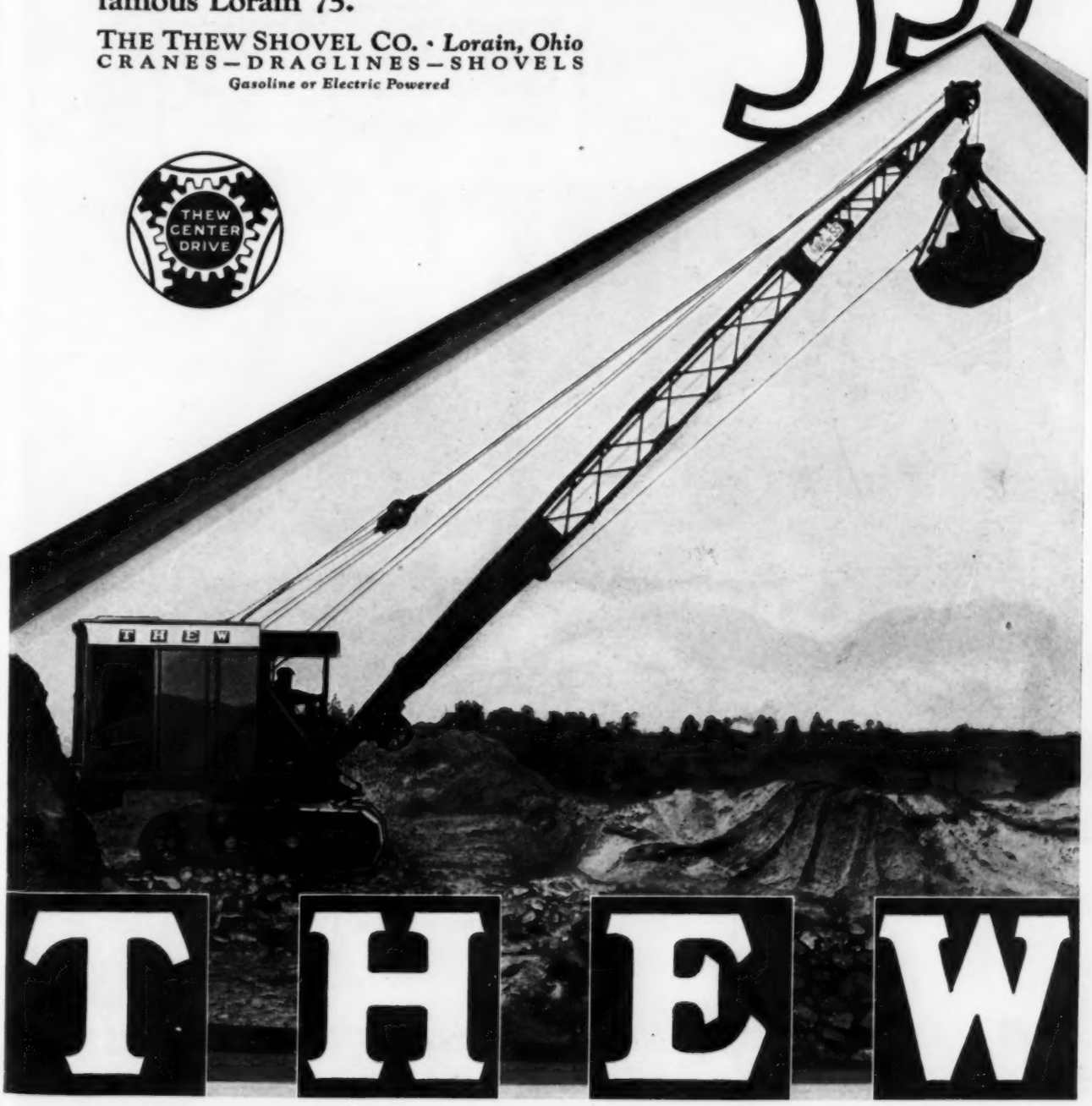
curved to either side of the tangent. It is composed of small cast-steel sections, with stop-ears attached, which rest in chairs mounted on cross ties. When the flexible track is swung to one side, the inside sections contract and the outside sections expand, permitting both rails to assume a true curve. The device was designed originally to clean up mine rooms with track-mounted machines.

THE NEW LORAIN 55

HERE is power combined with speed that will master the toughest going. It is the new Lorain 55—a one-yard Center Drive Crane—Clamshell—Shovel—Dragline of the same outstanding design and construction as the famous Lorain 75.

THE THEW SHOVEL CO. · *Lorain, Ohio*
CRANES—DRAGLINES—SHOVELS
Gasoline or Electric Powered

THEW CENTER DRIVE



THEW

for Economical Transportation

CHEVROLET

Another Chevrolet Achievement - the New Utility 1½ TON TRUCK

Greater Speed · 32% More Power
50% More Capacity · · 7 inches
More Wheelbase · · · 4 Speed
Transmission · 4 Wheel Brakes

and

6 CYLINDERS

Illustration shows Dump Body mounted on the New 1½ Ton Truck Chassis

1½ TON
Chassis only
$545

1½ TON CHASSIS WITH CAB	$650
LIGHT DELIVERY CHASSIS	$400
SEDAN DELIVERY	$595

All prices f. o. b. factory Flint, Michigan

OFFERING scores of vital advantages never before available in a truck priced so low, the new Chevrolet Utility 1½ Ton Truck represents the outstanding achievement of the world's largest builder of trucks!

The new six-cylinder valve-in-head engine develops 32% more power with correspondingly higher speed and faster acceleration. The 131" wheelbase—7" longer than before—provides full 1½ ton capacity with ample room for mounting every conceivable body type. The four-speed transmission and four-wheel brakes assure maximum efficiency under every haulage condition, from gravelpit work to high-speed city delivery. *And it operates at as low a cost as its famous four-cylinder predecessor.*

Ask your Chevrolet dealer for a demonstration. Learn how this remarkable new truck will do your work better and cheaper than any other truck you can buy!

CHEVROLET MOTOR COMPANY, DETROIT, MICHIGAN
Division of General Motors Corporation

- a Six in the price range of the four!

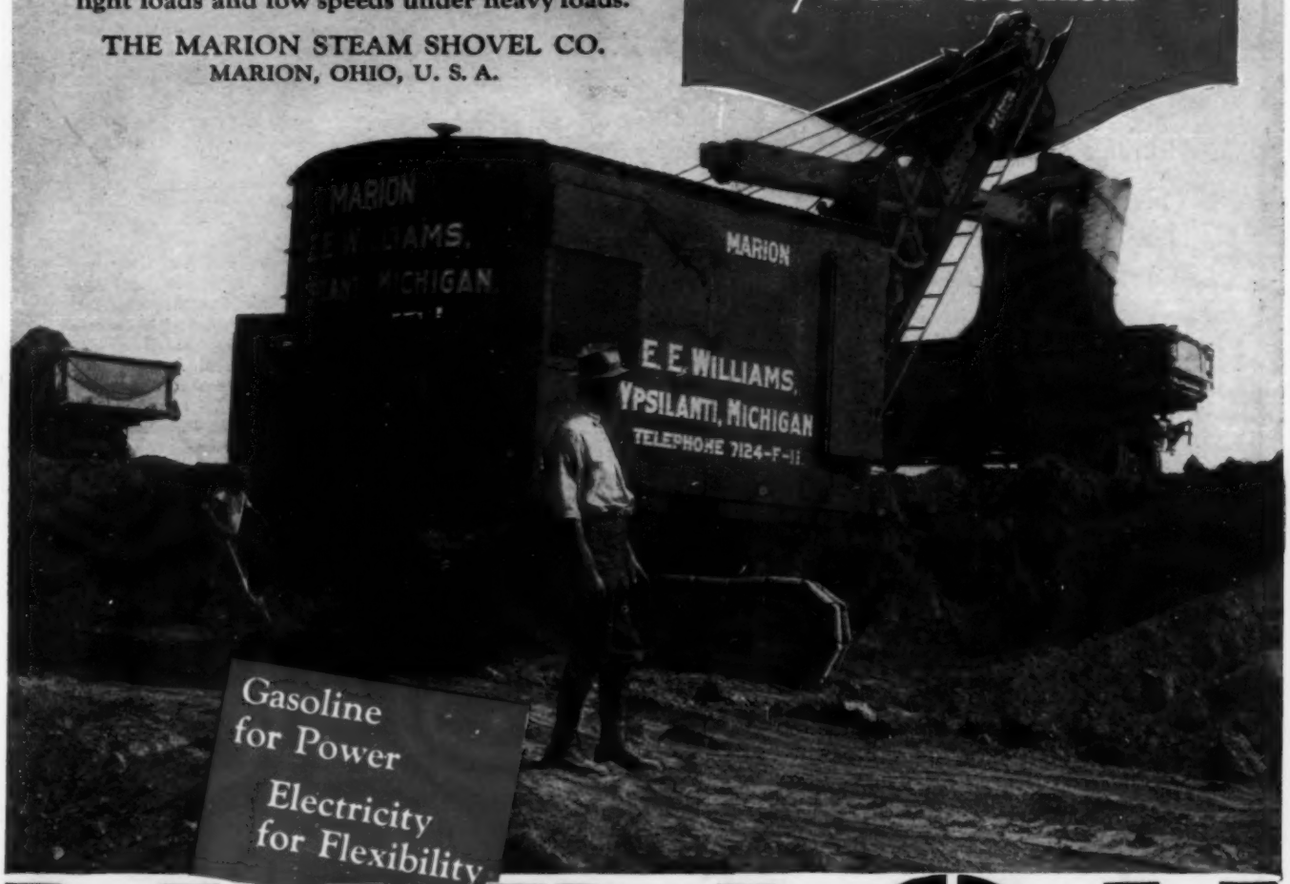
The Gas-Electric gives you more shovel for your dollar

The Gas-Electric is a long life machine — the flexibility of the three motor drive insures this

MANY of the first Gas-Electrics, built more than seven years ago, are running today producing good yardages at remarkably low operating costs. Throughout the intervening period they have continued day in and day out to give to their owners full satisfaction and honest work.

The Gas-Electric is equipped with three independent motors direct geared to their drives and thereby operates in the same manner as the steam shovel. It is the only gasoline powered shovel on which the hoist, swing and crowd inherently operate at high speeds under light loads and low speeds under heavy loads.

THE MARION STEAM SHOVEL CO.
MARION, OHIO, U. S. A.

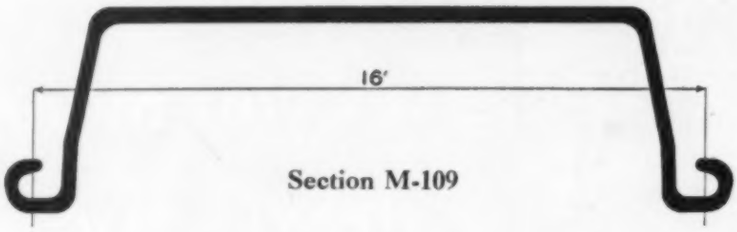


MARION

29004

A New Carnegie

Deep Arch Web Piling Section (M-109) is now available



Section M-109

Section Modulus for the Single Piece	9.00	Inches³
Section Modulus per Horizontal Foot of Wall	6.75	Inches³
Weight per Linear Foot of the Section	31.70	Pounds
Weight per Square Foot of Wall	23.75	Pounds
Driving Width	16.00	Inches
Number of Pieces per 100 Feet of Wall	75	
Thickness of Web	⅜	Inch
Depth of Piece from Driving Line	3 15/16	Inches

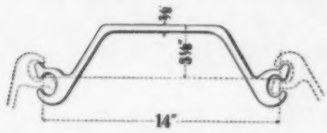
This section is designed to meet requirements where a high section modulus is desired with the lightest weight, thus reducing bracing and cost of piling to a minimum. It is recommended for use where the soil is favorable for driving, free of difficult obstructions, and where the lengths to be driven are not excessive.

Like the heavier arch web piling section M-106, it is especially adaptable for retaining walls, dock walls, cofferdams and other subsoil work where the highest strength obtainable in bending is necessary.

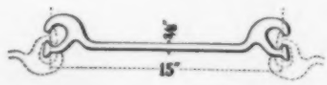
The light weight, the great strength in bending, and the 16" driving width, requiring fewer pieces for a length of wall, are all features which combine to make this an economical piling section.

Your inquiries are invited.

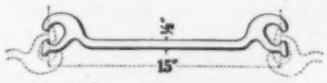
Other Sections



M-106—Weight per foot, 36.9 lbs. Weight per foot of wall, 31.6 lbs. Section Modulus per single piece, 10.34 in.³ Section Modulus per horizontal foot of wall, 8.86 in.³ Characterized by light weight per square foot of wall and high lateral stiffness, providing easy handling of long lengths, a stiff section under hard driving conditions, and a minimum of bracing.



M-107—Weight per foot, 38.6 lbs. Weight per foot of wall, 30.9 lbs. Section Modulus per single piece, 4.10 in.³ Section Modulus per horizontal foot of wall, 3.28 in.³ This section is of particular value for all cases where the interlocks are in tension as in filled cellular construction, or circular foundation retaining walls where loads are applied inside of the wall.



M-108—Weight per foot, 42.8 lbs. Weight per foot of wall, 34.3 lbs. Section Modulus per single piece, 4.10 in.³ Section Modulus per horizontal foot of wall, 3.28 in.³ This section is designed especially for permanent work where specifications call for a minimum thickness of ½ inch.

CARNEGIE STEEL COMPANY

Subsidiary of UNITED STATES STEEL CORPORATION

CARNEGIE BUILDING—PITTSBURGH, PA.

1948

watch it work

SEE it step out of the mud with a load that seems bigger than all outdoor itself. Watch it move a train of loaded trucks into a jogging trot from a dead standstill. Notice how it never seems to find the job that's too big, or the soil that's too "tough" for its sure-footed traction.

There are plenty of reasons for this great power. A score of mechanical features such as a pin drive track, a silent chain drive and oversize main bearings. Then, too, there are eighty-two years of stored-up manufacturing genius behind it—experience gained in the building of some of the biggest power machinery of the age.

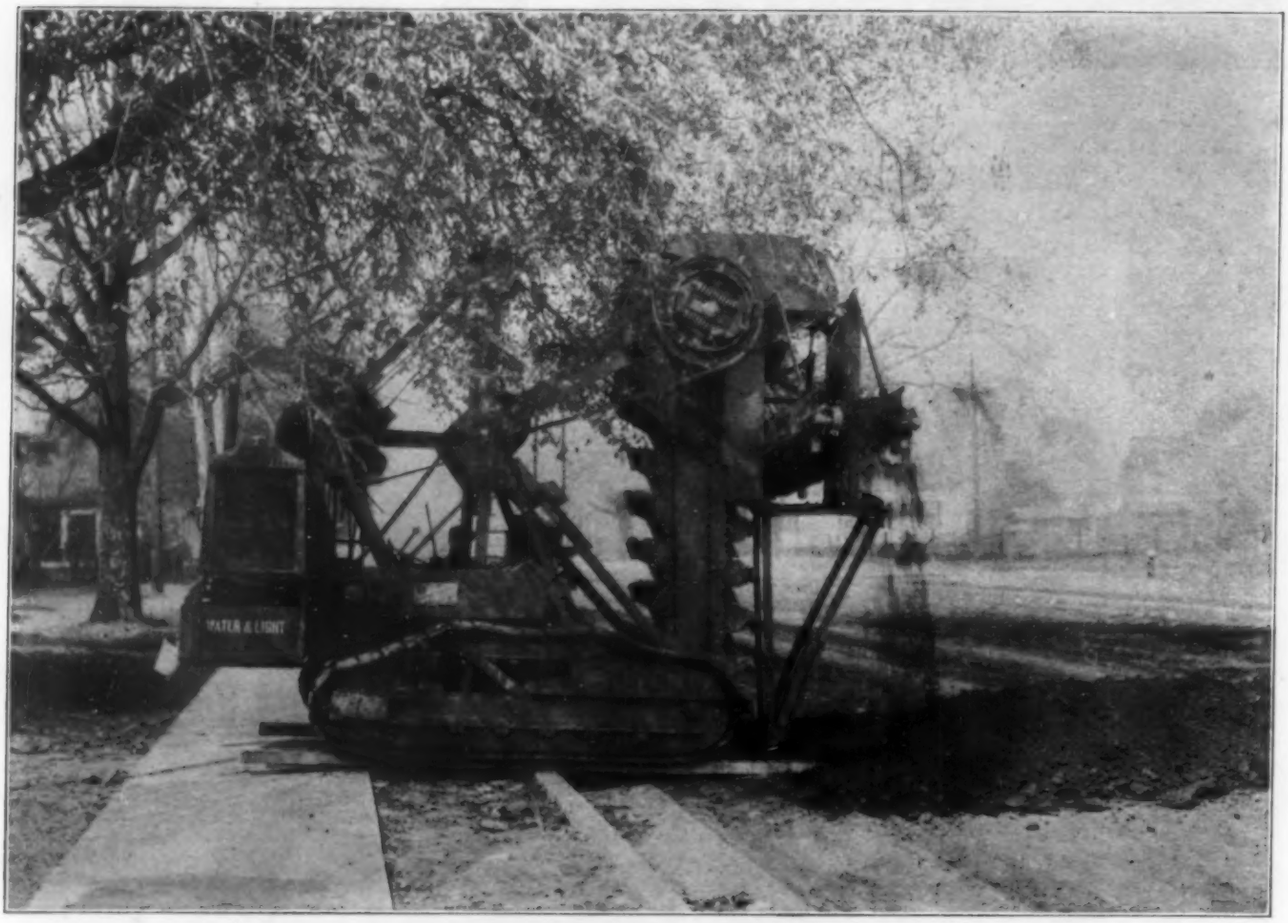
There is an Allis-Chalmers-Monarch tractor for every power need whether it's township or county work, heavy hauling or snow plowing, lumbering or farming. See the Monarch dealer near you.

Seventy-five
$5350.00
Fifty
$3625.00
F. O. B.
Springfield, Ill.

ALLIS-CHALMERS MANUFACTURING CO.
Monarch Tractors Division
SPRINGFIELD, ILLINOIS

Monarch Tractors

PULLING UP THE VERTICAL BOOM TO JUMP THE CURB



UNLIKE all other ditchers, the Barber-Greene leaves no ramp to be removed by hand—for the *vertical boom* digs straight down and comes straight up. With the B-G, services can be carried flush to the curb, sidewalk or building.

And the "milling" action of the B-G vertical boom is not balked by the macadam which stretches from main to curb. In spite of this "diggability" the Barber-Greene will not damage underground lines it may encounter. The *Overload Release Sprocket* automatically lets go immediately.

As to costs, the B-G shown above cut 30,000 feet of main trench and services for the City of Thomasville Water and Light Dept. at an average cost of 4½c per foot. (We have other records still lower.)

Write for a copy of "Ditching Snapshots and Records" giving the experiences of other Barber-Greene enthusiasts in cutting ditching costs.

Only walk and curb left for picks and shovels

BARBER - GREENE COMPANY
530 W. Park Avenue ∴ Aurora, Illinois

BARBER GREENE

Behind the cover you will find

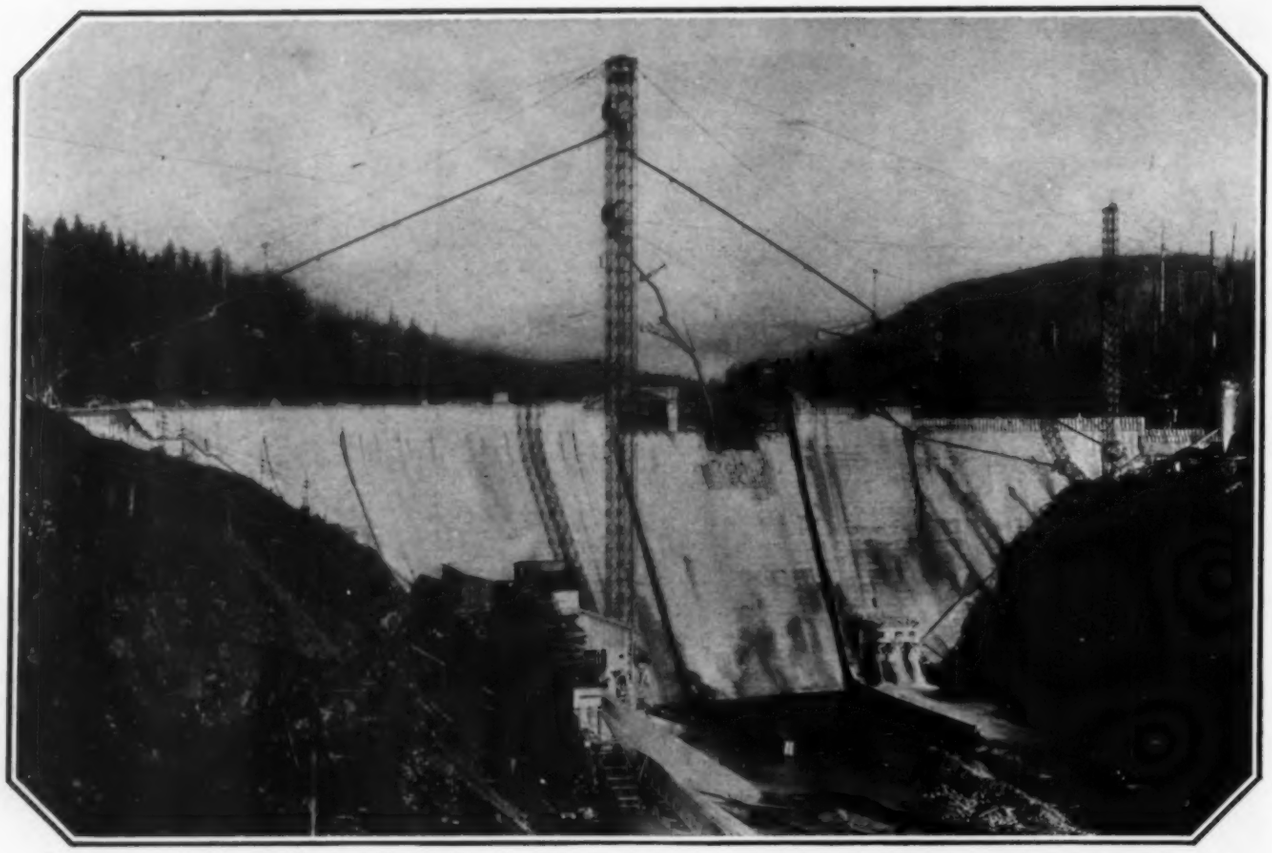
Complete information on pile driving and sub-aqueous foundation equipment and the application of same for both ordinary and extremely difficult conditions. This book not only completely describes and illustrates the Union Line but it also contains information with illustrations, tables, charts, etc., on subjects which have heretofore not been compiled and published under one cover. It also covers the development of pile driving from medieval times to date, the early use of compressed air for the construction of deep foundations and tunnels and the present methods employed, information on the bearing power of piles, data on the use of the water jet to aid pile driving, etc., etc.

112 PAGES of helpful data

Engineers, contractors and executives concerned with construction work owe it to themselves to have a copy on hand for ready reference. As we have spared neither trouble nor expense to publish this book, it is essential that we limit its free distribution. Send your request for a copy on your company's letterhead as only requests coming from legitimate sources can be honored.

UNION IRON WORKS, Inc. Newark and Grove Sts. **Hoboken, N. J.**

ASK FOR CATALOG 124 – IT'S NEW



Insley on the Bull Run Storage Dam

INSLEY Concrete Placing Equipment handled all the concrete on the Bull Run Dam, constructed by Bent Bros. Inc., Los Angeles. This is a storage dam for the city of Portland, Oregon.

This dam is 200 feet high, 950 feet long, 142 feet thick at the base and contains 230,000 cubic yards of concrete. The 360 foot Insley steel main hoist tower is the same one which handled 360,000 cubic yards of concrete on the Exchequer Dam, and the rehoist tower handled 210,000 cubic yards on the Pacoima Dam, both of which were likewise constructed by Bent Bros. Inc.

Mr. K. L. Parker, superintendent of the Bull Run Dam job, says, "I do not hesitate to recommend to the highest degree Insley Chuting Equipment on any project where it is desired to place concrete efficiently, speedily and profitably."

Here is another example of the fact that wherever big and important concrete work is going forward, there Insley concrete placing equipment is found.

Ask Insley.

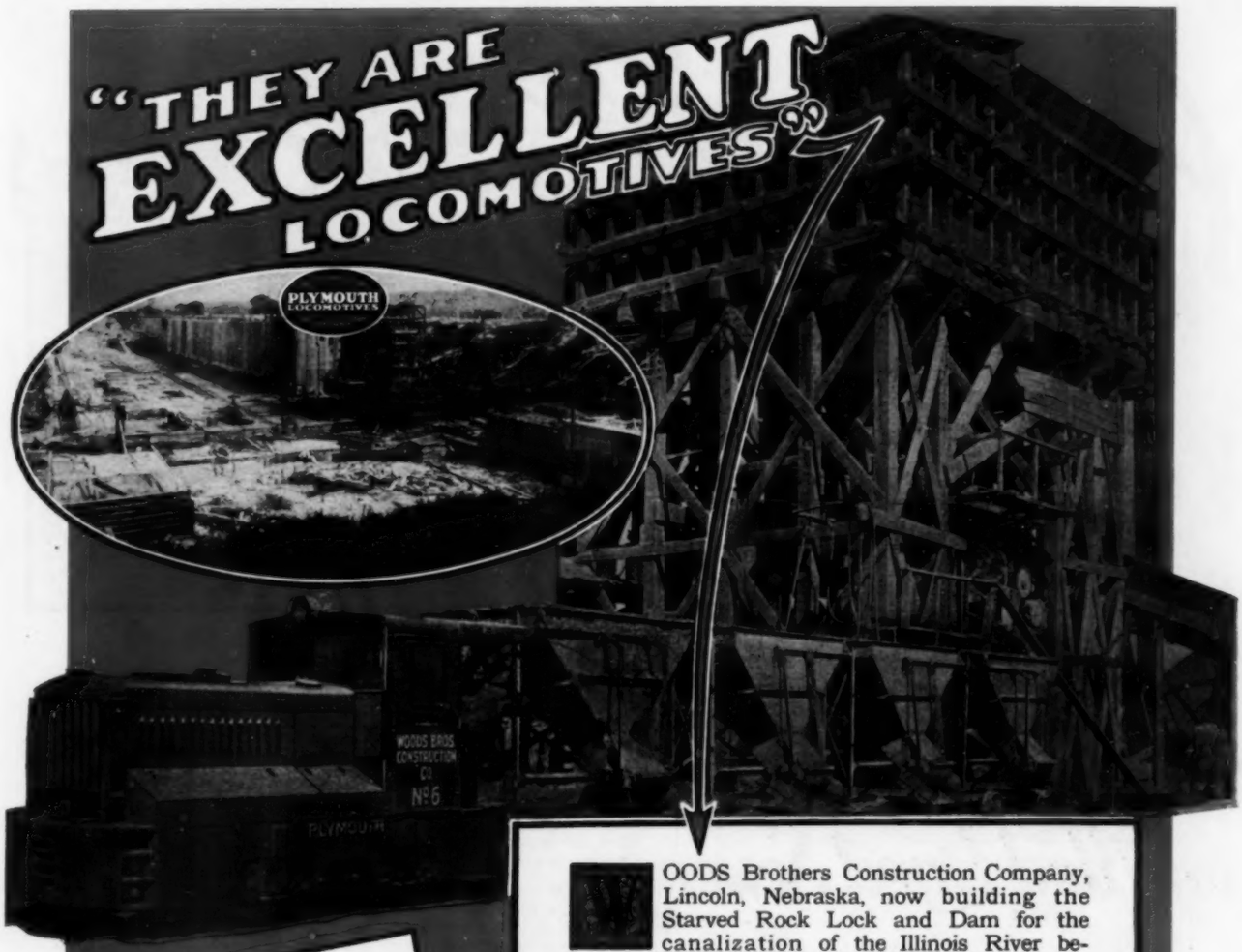
INSLEY

MANUFACTURING COMPANY · INDIANAPOLIS

ENGINEERS AND MANUFACTURERS 708

Division of National Equipment Corporation

"THEY ARE EXCELLENT LOCOMOTIVES"



WOODS BROS. CONSTRUCTION CO.
ENGINEERS AND CONTRACTORS
LINCOLN, NEBRASKA

Dec. 2, 1927

The Fate-Root-Heath Co.
Plymouth, Ohio

Gentlemen:—

Our first experience with Plymouth gasoline locomotives was in building fourteen miles of concrete seawall on the Gulf Coast, where three 8-ton Plymouth units were used for a period of seven months. These locomotives were operated continuously under most severe conditions, at an astonishingly low figure for maintenance, and at the finish of the job were in excellent condition.

They were then transferred to our Starved Rock, Illinois Job, where we are placing a total of 100,000 yards of concrete, all to be handled from a central mixing plant in 2 yard cars. In order to complete our daily schedule, it was necessary that more power be provided, so three duplicate 8-ton units were purchased, making six Plymouths in all handling this job, and carrying out our program continuously without any delays.

We have absolute confidence in the ability of Plymouth locomotives to handle our hauling problems in a most satisfactory manner

Very truly yours,
WOODS BROS. CONSTRUCTION CO.
Wayne Pringle
Chief Engineer

WOODS Brothers Construction Company, Lincoln, Nebraska, now building the Starved Rock Lock and Dam for the canalization of the Illinois River between Joliet, and Utica, Illinois, made this statement of their Plymouths while working them all, twenty hours per day.

Three eight-ton Plymouths hauled 900 yards of concrete per day. The haul is 1200 feet and they use 3 trains of 3 cars each. An interesting feature here also is the moving of the 130 ton steel lock wall forms with the Plymouths. These forms run on rails and are moved 60 feet each time—this is accomplished in 30 minutes

"We are showing them plenty of hard work, and they have never failed to respond," says Mr. George K. Leonard, General Superintendent of this important piece of construction.

From where the jobs are the hardest, comes the strongest praise of Plymouth performance.

PLYMOUTH LOCOMOTIVE WORKS
The Fate-Root-Heath Company
299 Riggs Avenue, PLYMOUTH, OHIO

PLYMOUTH

GASOLINE *Locomotives* DIESEL

If it's a Track Haulage Problem
There's a SOLUTION to Solve It

Again ~ Blawforms

on Tiled Lined Sewer

AGAIN, as on thousands of other concrete jobs, Blaw-Knox STEEL FORMS prove their economy on the 2½ mile Cuyahoga Outfall Sewer for the City of Akron, Ohio.

To expedite handling, the inside and outside travelers are motor equipped.

The Holmes Construction Company are maintaining a schedule of production which will bring the work to conclusion far ahead of time.

Their letter illustrated on the right tells the story.

August 29th, 1928

Mr. H. B. Loxterman
Ass't. General Sales Manager
Blaw-Knox Co.,
Pittsburgh, Pa.

Dear Sir:

In reply to your letter of August 21 in regard to the steel forms for the Cuyahoga River Outfall Sewer, Contract No. 1, Akron, Ohio, I am glad to inform you that our experience with your forms on this job have been highly satisfactory.

When I went over this job with Mr. Brynholdt, your Chief Engineer, we decided that we would organize the job to take care of nine seventy-five foot sections per week. We have found since putting power on the outside traveler that we can consistently build two sections per day. In fact, in the last fifteen days we have actually completed thirty sections of seventy-five feet each. In constructing, to-date, over eight thousand feet of sewer we have only had one case where we had the slightest trouble with our forms and this caused a delay of less than one hour.

It is rather unusual to organize a job for a certain amount of work and then find the equipment is perfectly adapted to obtain one-third more output. To put it mildly, we are perfectly satisfied with our equipment and have no suggestion, whatsoever, to make in the way of improvement.

We have had some very good photographs taken of this work and if you desire same we will be glad to furnish you with views showing inside and outside methods of construction.

I might further state that if we are able to maintain the same rate of progress which we have made in the past month that we will finish the work fully a month ahead of schedule. This in itself, when you remember that we are only working one ten-hour shift and no work on Sundays or Holidays, proves that the forms are functioning absolutely satisfactory,

Yours truly,

THE HOLMES CONSTRUCTION CO.

By A. Stallhorn
Chief Engineer.

AS/NCD

BLAW-KNOX COMPANY
686 Farmers Bank Building
Pittsburgh, Pa.

NEW YORK 342 Madison Avenue
CHICAGO Peoples Gas Building
BIRMINGHAM Brown-Marx Building
BUFFALO Genesee Building
CLEVELAND 616 Union Building
BALTIMORE Bayard and Warner Sts.
DETROIT Lincoln Building
PHILADELPHIA 332 Widener Building

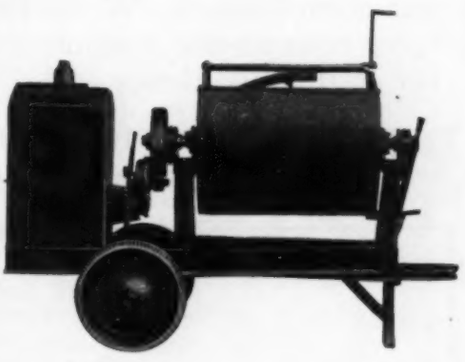
Export Division:
Milliken Bros.-BlawKnox Corp., Canadian Pacific Bldg., New York

BLAW-KNOX

SPEED and STRENGTH
LEACH HAS THEM BOTH

ANOTHER pace setter in the Leach line of mixers—the *New*, All-Steel Plaster and Mortar Mixer. Unquestionably a leader in speed in handling batch—in supplying 25 plasterers—in *strength* because of the Leach All-Steel Construction. It's a big time and money saver.

Think of it—all electric-welded steel frame—auxiliary drum clutch lever—self-aligning bearings—steel bar bag holder—can be had with hoisting outfit.



Send for a copy of our new Catalog which completely describes and pictures Leach Plaster and Mortar Mixers. It's yours for the asking. *Write today.*

LEACH COMPANY, *Oshkosh, Wis.*

LEACH MIXERS
• PLASTER AND MORTAR •

Get This Latest Information

On Your Chosen Field

PACKED within the pages of this handy treatise is complete usable information on the latest and approved method of curing concrete streets and roads.

Curing Concrete Highways contains just the kind of material every wide-awake road man needs to keep abreast of the times. Shows how to save time, trouble and money on highway jobs. A complete non-technical discussion of modern methods, illustrated with photographs of actual construction.

This valuable handbook sent with our compliments. Write for your copy today—the coupon below is for your convenience.

THE GRASSELLI CHEMICAL CO.
Established 1839 **Cleveland, Ohio**
Branches in 19 cities

The Grasselli Chemical Co.,
Guardian Bldg., Cleveland, O.

Please send me, without obligation, a copy of **Curing Concrete Highways**.

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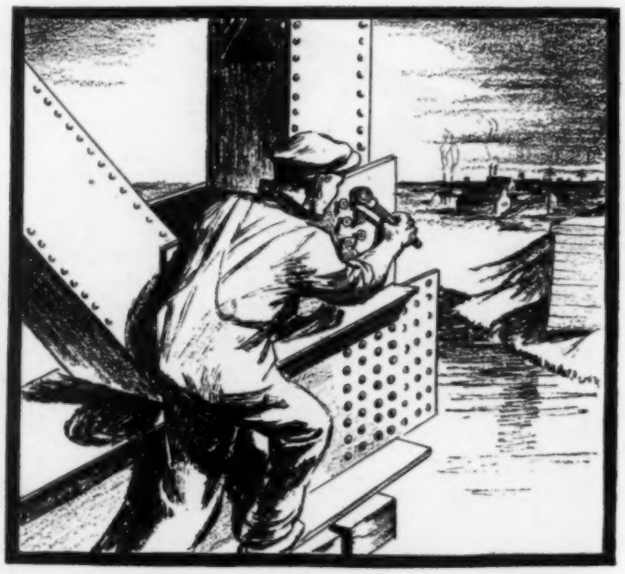
Address .....

City and State .....

GRASSELLI GRADE
A Standard Held High for 90 Years



For Bridge Work

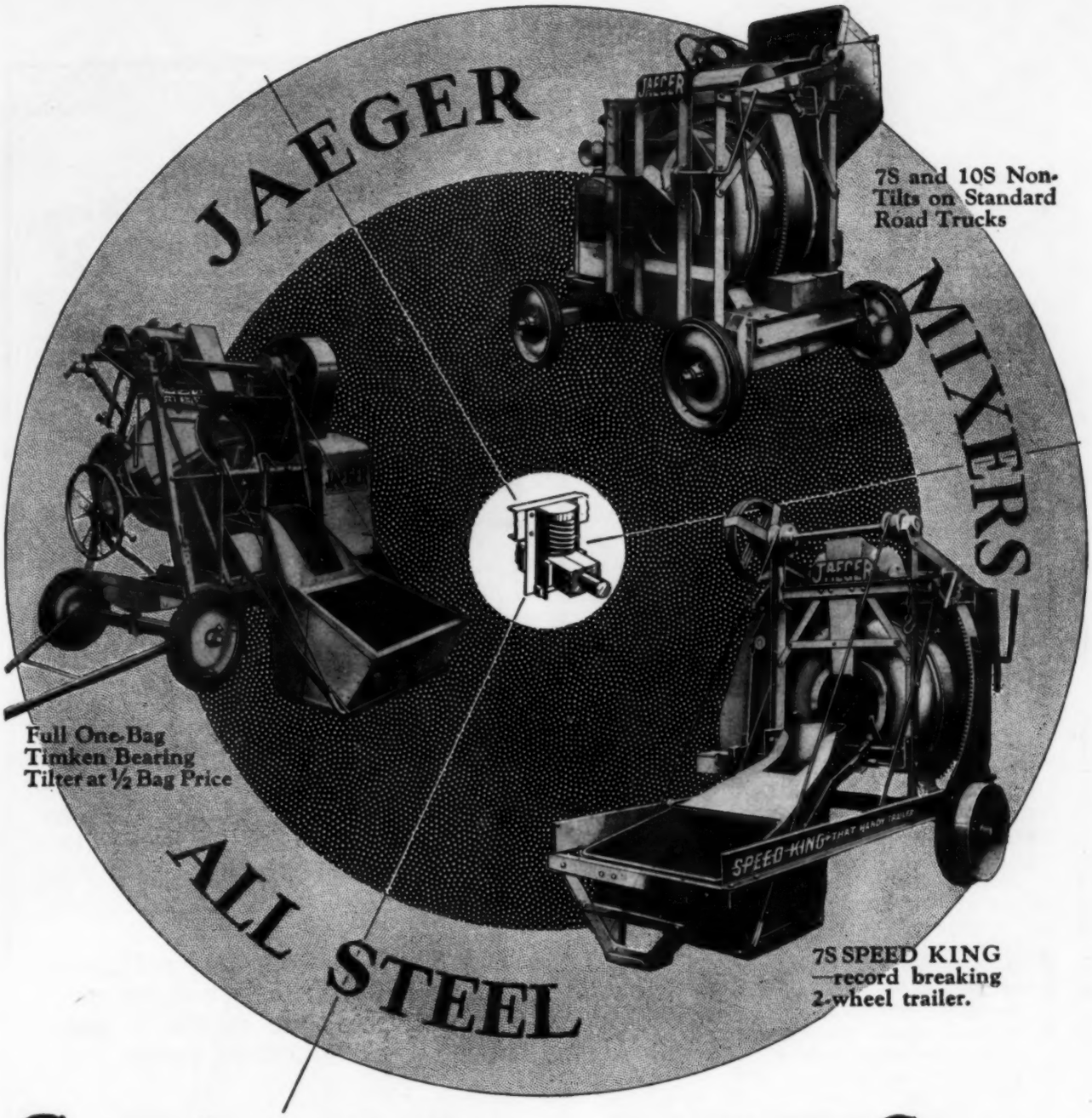
For those one-hand wrench jobs, Lowell Steel Socket Bridge Wrenches do the work easily and quickly.

With a Lowell you can turn nuts on or off without removing the wrench—and turn the trick with one hand. And what a difference there is between the speedy pumping of a Lowell and the more laborious way of refitting after every turn. The first fitting is the last. No time lost getting the wrench back on the nut.

May we send you complete catalog R? Big special wrenches for special needs.

LOWELL WRENCH CO.
Worcester, Mass.

LOWELL REVERSIBLE RATCHET WRENCHES


JAEGER
MIXERS
ALL STEEL
7S and 10S Non-Tilts on Standard Road Trucks
Full One-Bag Timken Bearing Tilter at ½ Bag Price
7S SPEED KING —record breaking 2-wheel trailer.
SPEED-KING

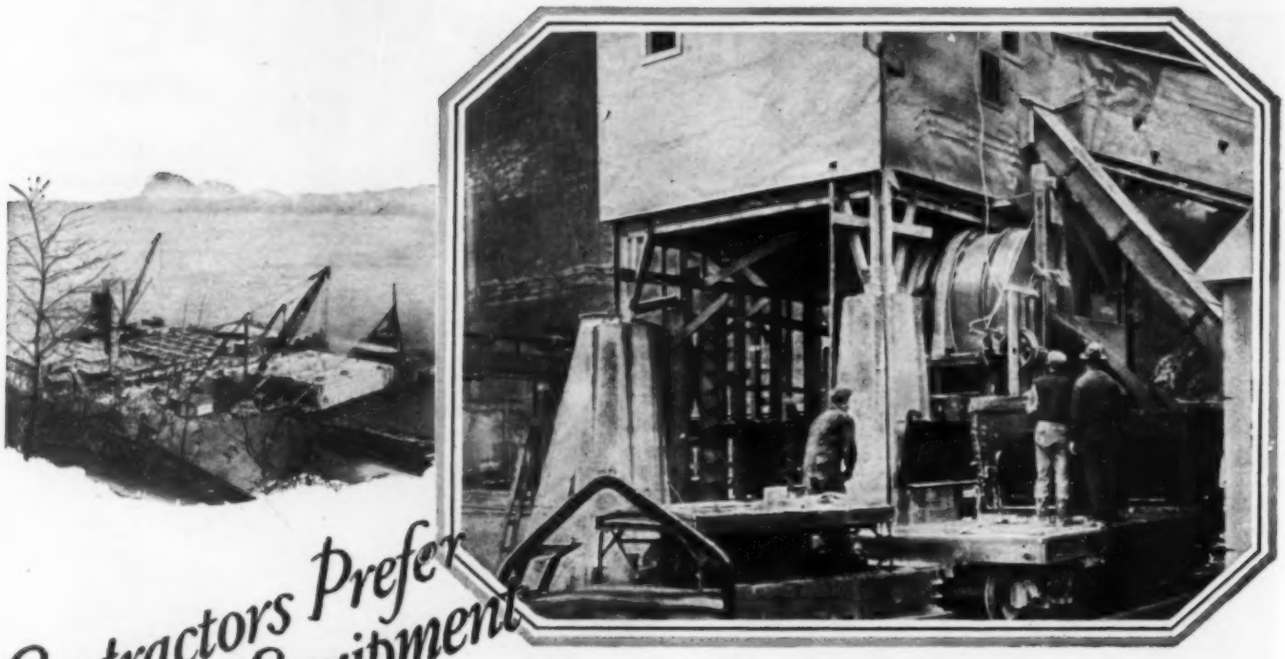
Spring Mounted to Save Wear on Tires and Mixer

EVERY 1929 Jaeger Mixer up to and including 10S size rides on a spring hung chassis. With Jaeger's all-steel, 100% ball bearing construction (50% stronger, ½ ton lighter), it makes for longer life—more *total* batches as well as more batches a day.

Jaeger construction, Skip Shaker, Accurate Measure Water Tank, exclusive mixing action and faster operation are money saving, money making features OK'd by over 75,000 users, backed by quick service from over 100 service stations. Write for catalog, prices, terms.

Mail this slip for Catalog and new low prices — Tilters 3½, 5, 7, 10, 14 ft.—Non-Tilters up to 28 ft.—1 and 2 bag Plaster Mixers.

THE JAEGER MACHINE CO. Date
800 Dublin Ave., Columbus, Ohio
Please send catalog, prices and terms on
☐ NON-TILT MIXERS ☐ TILTING MIXERS
☐ PLASTER MIXERS
Name
Address



Contractors Prefer Electric Equipment

These reasons were given by representative contractors, queried in a nation-wide survey:

- Economy
- Few repairs
- Low upkeep
- High salvage value
- Dependability
- Best for cold-weather work
- Breakdowns minimized
- No smoke or soot
- No handling of fuel or ashes
- Reduced fire hazard
- Convenience
- Ease of handling and operating
- Compactness
- Flexibility
- Noiseless
- No water lines.

In the operation of CONCRETE MIXERS

This Ransome concrete mixer is being used by the Silas Mason Co. in the construction of the suspension bridge over the Hudson River at Fort Lee, N. J. It is operated by G-E Motorized Power.

The Silas Mason Co. is one of many nationally known contractors who not only employ electricity on their projects but utilize it most effectively through G-E Motorized Power.

—and other contractors say:

"At the present time the bulk of our work is being built with electric power. We feel that electric power, where available, is more adaptable and less expensive than steam power."
—Morton C. Tuttle Company

GE Motorized Power
—fitted to every need

200-177

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

THE RIGHT TOOL SAVES TIME

KEEP FLOORS CLEAN

The True Temper Scraper is excellent for breaking and removing extra heavy and sticky deposits from floors, for chopping away ice that hinders construction, and for any work requiring a heavy duty scraper.

It is a necessary tool in such places as machine shops, round houses, cement plants, paper mills, and on construction jobs.

Made of high carbon steel, well tempered, and sharp edged. It will stand the hardest use on wood, concrete, or iron surfaces.

Blade is 7" wide by 8" deep. Handle is 4 feet long.

The brand True Temper is burned in the handle of each scraper to mark it as the best tool of its kind that can be made.

THE AMERICAN FORK & HOE CO.
1901 Keith Bldg.
CLEVELAND, OHIO

Makers of Farm and Garden Tools for over 100 years.

If your dealer has not yet stocked the Scraper, Cat. No. 7C, send us his name and $1.35 and we will supply you direct, postpaid.

SCRAPER

Branded on the handle of every genuine TRUE TEMPER *tool*

FREE ON REQUEST

Heavy Steel Goods or Industrial Tool Catalog. Describes over 50 tools for mill, mine, factory and coal yard.

TRUE TEMPER TOOLS

DIETZ

LITTLE GIANT

Burns 70 hours without refilling

IN traffic control there is only ONE COLOR that shouts DANGER in language which everybody understands and instinctively obeys. That color is RED!

For this good reason Dietz Red Globed Lanterns are preferred by most contractors as warning lights on road work and excavations.

Particularly useful for this purpose are Dietz "Little Giant" Lanterns—distinguished for dependability, high lighting power, fuel economy, and 70 hours continuous burning without refilling.

Try Little Giants. Get them from your supply dealer.

R. E. DIETZ COMPANY
NEW YORK

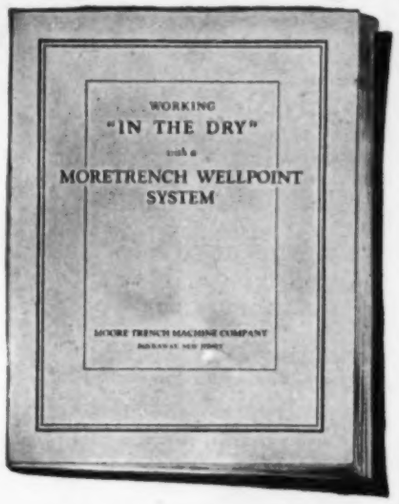
Largest Makers of Lanterns in the World
FOUNDED 1840

use RED — DIETZ LANTERNS — No other color means DANGER

IN BROOKLYN

A million-dollar theatre project. Footings sixteen feet below street. Ten feet of water. Ordinary pumping endangered foundations of adjoining buildings. Grade raising was suggested but the architect wouldn't stand for that. How about MORETRENCH? Now you're talking . . . but can we pay the price?

Cost digestion took twenty-four hours . . . things looked different in the morning. Four days dried them up — dry digging handles fast and Mr. Architect put some of the work down three feet deeper and nobody had a fit about it either.



And if you want a bargain in about six dozen pair of perfectly good rubber boots we can tell you whose doorbell to ring.

Get a catalog about the

MORETRENCH WELLPOINT SYSTEM

Learn how to make "DRY ONES" out of "WET ONES."

MOORE TRENCH MACHINE CO. ROCKAWAY, NEW JERSEY

And now—the

"AUTOGRADER"

By

Red Seal Continental Motor—operates as easily as a motor truck.

GoodRoads MACHINERY

Bulletin KAG will fully explain this—the last word in graders.

THE GOOD ROADS MACHINERY CO., Inc.
KENNETT SQUARE, PA.

Branches:
Philadelphia New York Pittsburgh Chicago Watertown, Mass.

DIXON'S BELT DRESSING

Leather, rubber, and fabric belts all grip better when treated with Dixon's Belt Dressing—and, this aid to longer belt life and better operation "goes on" without the slightest danger of "clogging" or harming the finest belt.

Its handy stick form permits belt dressing without the stopping of machinery. To use it, simply tear off part of the paper around the stick, grip firmly in the hand and hold it on to the moving belt. No loss of time—no dirt—no slipping belts—and, in addition Dixon's "food for belts" will keep your belts in perfect condition.

If your belts are exposed to steam, spattering water, chemicals or heavy dust condition, order—

DIXON'S TRACTION BELT DRESSING

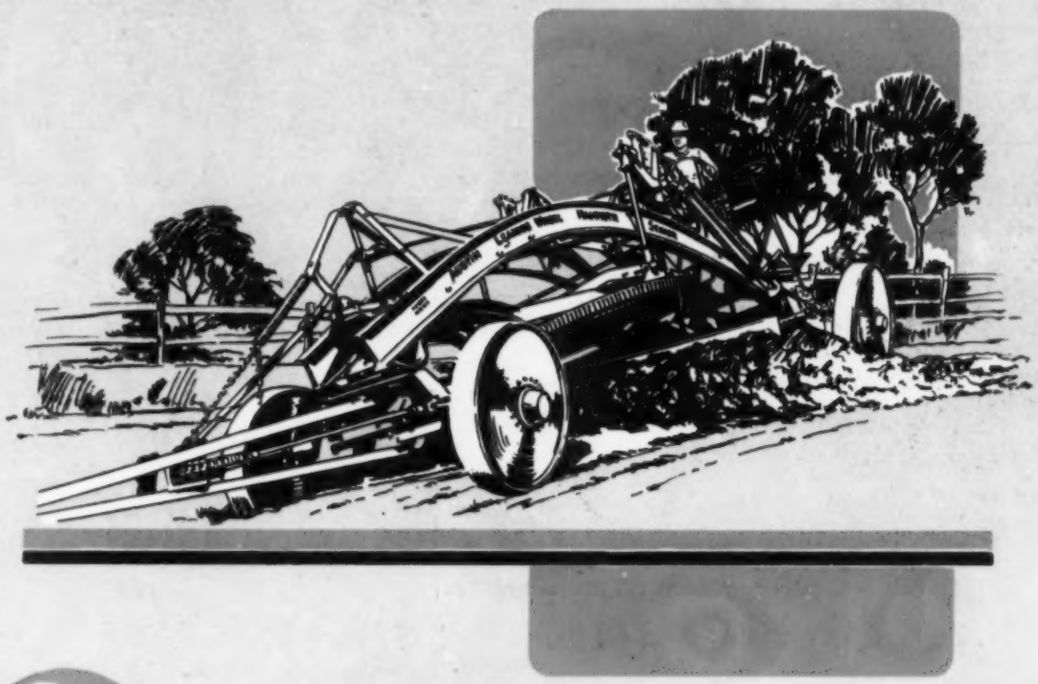
a special paste dressing made especially for this type of service.

Circular 86-O will give you full information on each of these products.

JOSEPH DIXON CRUCIBLE CO.

Jersey City — D X N TRADE MARK — New Jersey

Established 1827



Out on the roads this spring—*the tough jobs will be easier to handle than ever before*

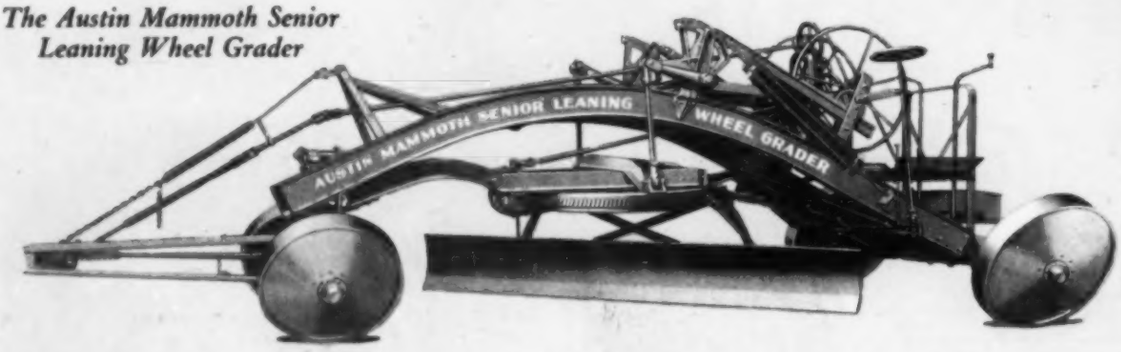
A freeze . . . then thawing . . . roads at their worst! Pulling ditches becomes a real test of grader performance.

Austin-Western Graders, with new and improved features bringing greater strength and handling ease, meet the needs of both public official and contractor for a quicker and more efficient means of handling heavy duty road work. By steadily setting the pace for progress with equipment that works more miles every day—Austin-Western Road Machinery is trimming time and labor costs and making it possible, year by year, to build more roads and better roads.

Austin-Western
ROAD MACHINERY

"Most miles for your road dollars"

The Austin Mammoth Senior Leaning Wheel Grader



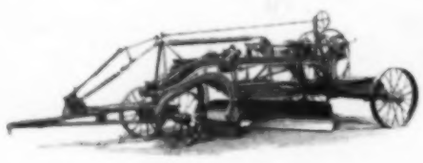
New features—
bring greater strength and handling ease to Austin-Western graders

Disc wheels with removable rims, stronger and non-clogging . . . "lost motion" eliminated with ball and socket joints . . . improved wheel leaning mechanism operating easier and quicker — these features assure supremacy in the grader field.

Sheer ability to move dirt will always be the first requirement of a good grader. The Austin Mammoth Senior Leaning Wheel Grader can bite twelve feet of blade into the hardest ground and keep the dirt rolling as long as the most powerful tractor can keep it moving. Increased handling ease, with the same freedom from breakdowns it has always enjoyed, gives this machine the ability to move more dirt — further — in any given time.

Only the twelve and ten foot graders are equipped with the new disc wheels as they were considered necessary for only the heavier machines.

All other improvements have been made in the eight and seven foot models as well.



The Western No. 55 Grader carries an 8 ft. blade and will work behind tractors up to 40 h. p. Great strength and unusual handling ease are produced by such features as cut gears, ball and socket raising rod connections and a new steerable offset hitch with enclosed worm gears running in grease.

Write for complete information on these machines

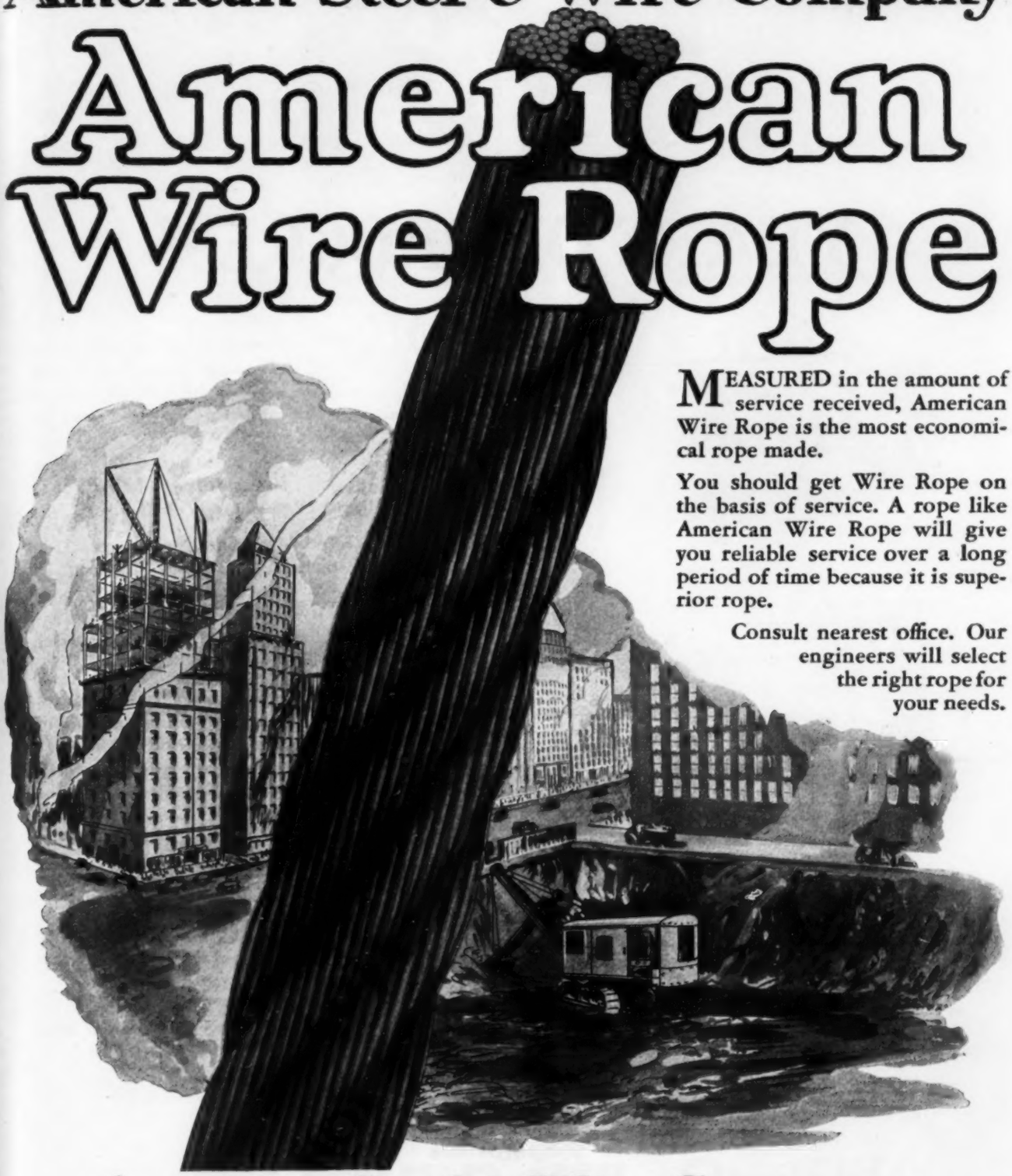
THE AUSTIN-WESTERN ROAD MACHINERY CO.

400 North Michigan Avenue, CHICAGO, ILLINOIS—Branches in principal cities

Leaning Wheel Graders, Straight Wheel Graders, Motor Graders, Elevating Graders, Crawler Dump Wagons, Scarifiers, Rock Crushers, Portable Conveyors, Rollers (Note: Steam Rollers Discontinued) Motor Sweepers, Street Sweepers, Sprinklers, Road Oilers, Hot Patch Portable Asphalt Plants, Plows and Scrapers

American Steel & Wire Company

American Wire Rope



MEASURED in the amount of service received, American Wire Rope is the most economical rope made.

You should get Wire Rope on the basis of service. A rope like American Wire Rope will give you reliable service over a long period of time because it is superior rope.

Consult nearest office. Our engineers will select the right rope for your needs.

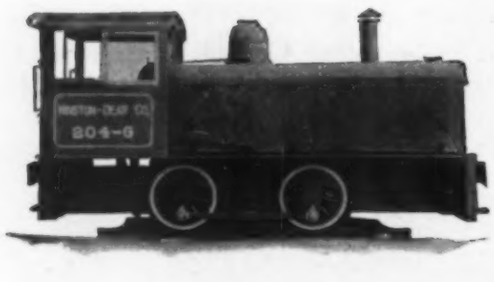
American Steel & Wire Company

Subsidiary of United States Steel Corporation

208 S. La Salle Street, Chicago — 30 Church Street, New York

Other Sales Offices: Boston Cleveland Worcester Philadelphia Pittsburgh Buffalo Detroit Cincinnati Baltimore Wilkes-Barre St. Louis Kansas City Minneapolis-St. Paul Oklahoma City Birmingham Atlanta Memphis Dallas Denver Salt Lake City
U. S. Steel Products Company: San Francisco, Los Angeles, Portland, Seattle *Export Representatives:* United States Steel Products Co., 30 Church St., New York

63
YEARS OF PROGRESS



MILLIONS of tons of materials amounting to billions of dollars in value have been faithfully transported since the introduction of the famous Porter Steam Engine away back in 1865. The Porter Engine of that day was the nucleus of the huge interplant railroad systems of today employing thousands of Porter Locomotives and tens of thousands of cars.

With the perfected development of the gasoline motor in recent years, Porter has again led in the introduction of a better built gasoline locomotive with many advanced mechanical features including the powerful direct line drive from motor to rear axle.

And now as a final step in progressive locomotive design and construction comes the Porter Gasoline-Electric Locomotive—built to the same rigid standard of Porter engineering and workmanship that have made its predecessors famous. You now have in Porter-built Locomotives your choice of steam, gasoline or electric drives each one having distinctive advantages for certain operating conditions.

H. K. PORTER COMPANY

Established 1865
PITTSBURGH, PA.

Chicago Office:
Engineering Building, Wells Street and Wacker Drive
New York Office: 44 Whitehall Street

PORTER
"better built"
locomotives

PORTER LOCOMOTIVES

Above—Demolition with a No. 6 McKiernan-Terry. Breaking up aqueduct of brick, concrete and heavy granite blocks. Did work on which hammer drills and explosives could not be used. Barsley Boulevard Sewer, Queens.

Above—Breaking up a highway sub-base. Concrete 6-in. thick, — asphalt surface — 18 ft. wide. 9B2 Hammer demolished 1000 lin. ft. 9 ft. wide every 8 hours.

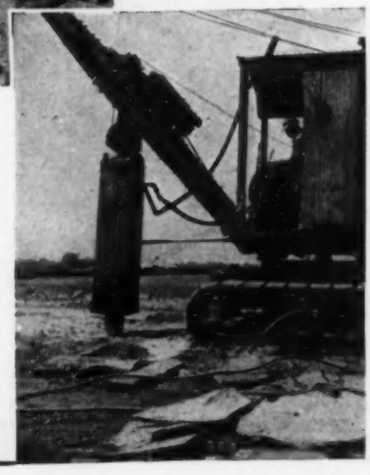
Left—No. 7 demolishing 2-story reinforced concrete building. Finished in 25 working days. Beat time and cost estimate of ordinary wrecking methods. Penetrates 12 ft. of 6 in. curtain wall in 6 minutes. Jarred reinforcement loose for quick cutting.

Left—Another view of results of work with hammer shown at top (right). Replaced a large gang of men and explosives.

McKiernan-Terry

for Construction *or* Destruction

These hammers, long a standard on some of the most extensive foundation construction work here and abroad, are now used for the rapid, economical destruction of old work, saving time, labor and explosives. *Write for details now.*



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14 Park Row, New York

Pile Hammers and Accessories, Drilling Machinery

Works at Dover, N. J.

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YANCEY BROS.
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YANCEY TRACTOR CO.
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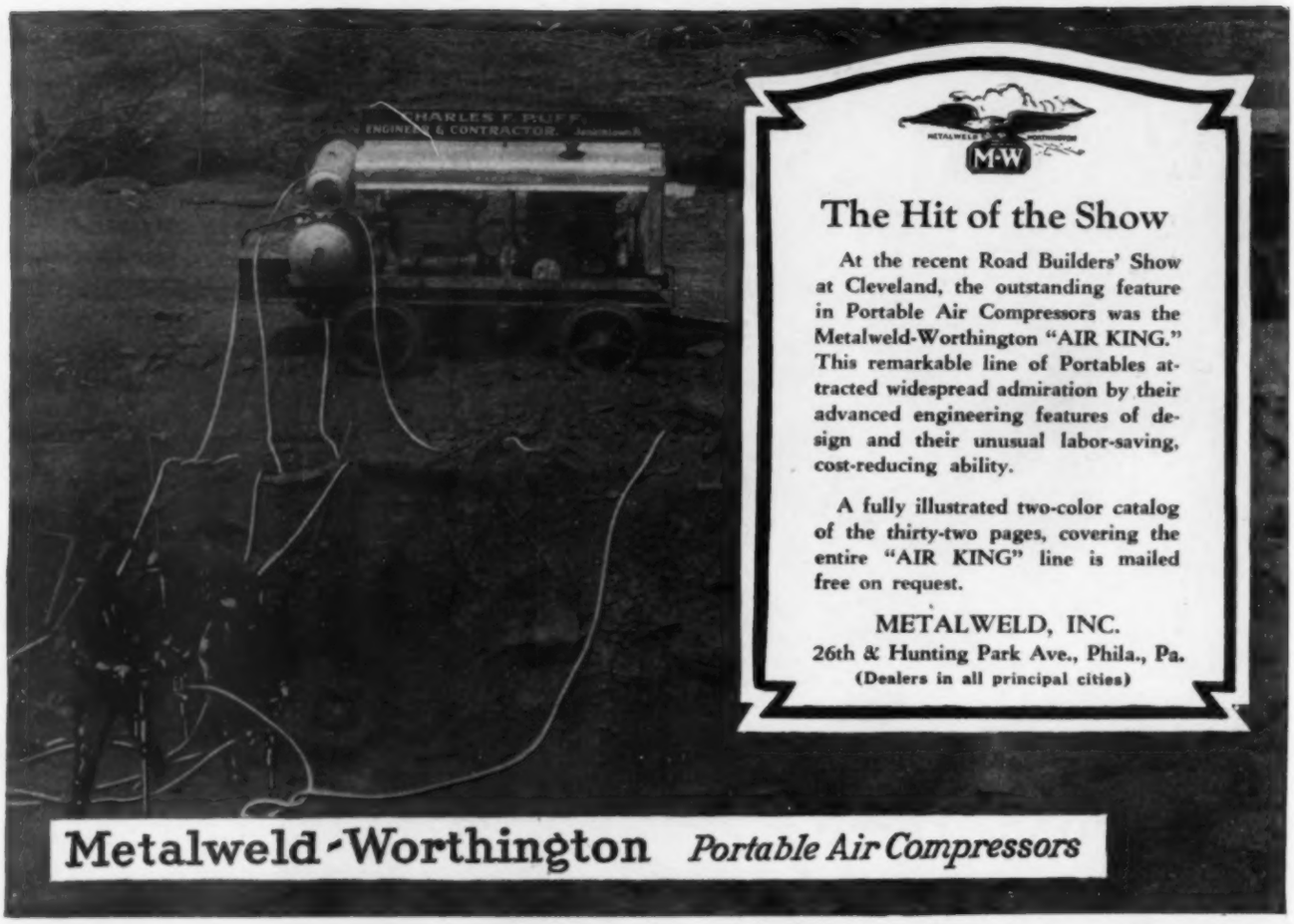
Foreign Representatives:

THE BRITISH STEEL PILING CO., LTD.
London, England



The Hit of the Show

At the recent Road Builders' Show at Cleveland, the outstanding feature in Portable Air Compressors was the Metalweld-Worthington "AIR KING." This remarkable line of Portables attracted widespread admiration by their advanced engineering features of design and their unusual labor-saving, cost-reducing ability.

A fully illustrated two-color catalog of the thirty-two pages, covering the entire "AIR KING" line is mailed free on request.

METALWELD, INC.
26th & Hunting Park Ave., Phila., Pa.
(Dealers in all principal cities)

Metalweld-Worthington *Portable Air Compressors*

Help for your pumping problems!

If you have trouble pumping asphalt or other viscous materials that will not flow at atmospheric temperatures, we can be of service to you. Every requirement is adequately met through the use of Iroquois Steam-Jacketed Pipe, Fittings and Pumps. They embody the experience of a quarter-century and are specially adapted for use in asphalt, oil and coal-tar refineries, and for plants manufacturing prepared roofing, gas, chemicals, starch, glucose, molasses, fatty acids, etc.

Iroquois Steam-Jacketed Pipes have one pipe inside of another, the inner one being surrounded by steam, keeping hot the material which is to be pumped.

The Iroquois Steam-Jacketed Pump which is also a part of the Iroquois system has proved so highly efficient because of these features:

Minimum number of working parts in contact with material being pumped. Large wearing surfaces to reduce wear. Large, straight passages for liquid being pumped. Simplicity of construction insures low maintenance cost. Ease of operation with no skilled attention. Steam jackets cover all moving parts—pump can be started and stopped at will without cleaning it. Perfect accessibility of all wearing parts. No springs or small, easily broken parts in valve chambers. Handles successfully viscous material containing large quantities of foreign matter without undue wear or operating troubles.

IROQUOIS Steam-Jacketed Pipe, Fittings and Pumps

IROQUOIS 3 in. Steam Jacketed Pump

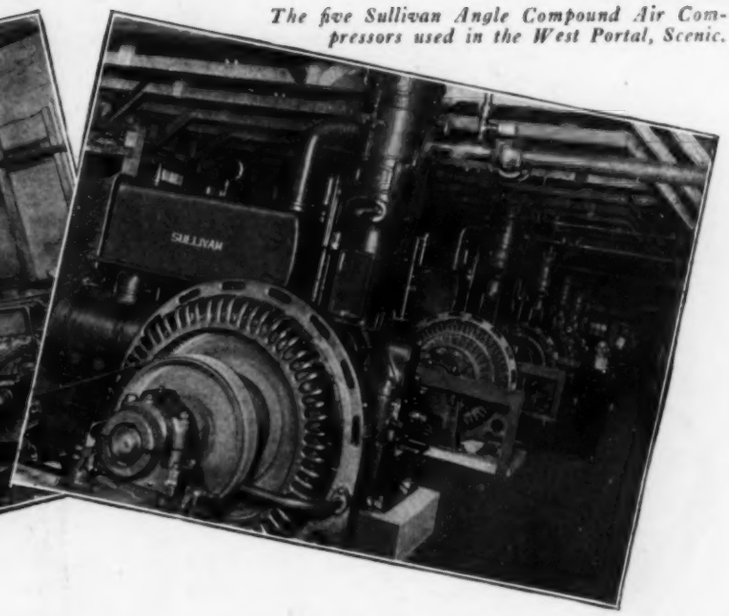
Complete data and specifications gladly sent upon request, together with information about the entire Iroquois Line of road-building machinery. Write us today.

Iroquois Sales Department

THE BARBER ASPHALT CO.
Philadelphia
New York Chicago
Pittsburgh St. Louis Kansas City San Francisco

Sullivan Sharpener and Furnace used in the West Portal Pioneer Heading at Scenic.

The five Sullivan Angle Compound Air Compressors used in the West Portal, Scenic.



Sullivan Compressors and Drill Sharpeners Helped Drive the Cascade Tunnel

Cascade Tunnel is completed!

A. Guthrie and Company have taken some kinks out of the Great Northern Main Line and have reduced the grade, between Scenic and Berne, Washington.

Splendid organization, and reliable drilling and mucking equipment pulled together to finish the 8-mile bore in the contract time of three years.

Eleven Sullivan Angle Compound Compressors direct motor driven, with a combined capacity of 12,463 feet, supplied dependable air power for the drilling, the drill sharpeners, and the power shovels.

Five Sullivan Drill Sharpeners and Six Sullivan Drill Steel Furnaces sharpened, shanked, and tempered all the steel used on this great job.

At the Mill-Creek shop alone, two Sullivan Sharpeners and three Furnaces handled 1,162,-903 pieces of steel in the three years, and only 6,086 pieces were broken in use, less than one-half of 1%.

At Scenic, two more Sullivan Sharpeners and three Furnaces handled the steel used in the West Portal heading.

The All-Hammer Sullivan sharpening process, combined with the pyrometer-controlled Sullivan Oil Furnaces, sent each lot of steel back to the face ready to hold its edge and gauge longer, and to drill farther without re-sharpening. Thus fewer changes of steel were necessary and less time was consumed in transporting and sharpening the steels.

These men broke the world's drilling record at West Portal, Scenic.

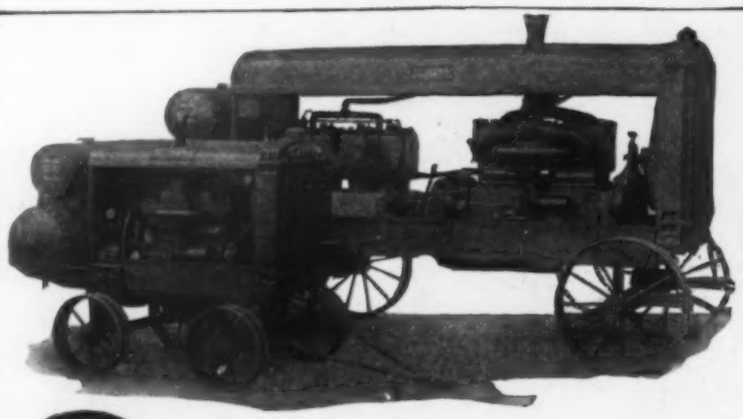
For your job too there is a Sullivan Sharpener available to speed up your drilling and add to your profit. Both heavy-duty and portable Sharpeners are available.

Send for the Catalogs.

SULLIVAN MACHINERY COMPANY
168 S. Michigan Ave.
CHICAGO

S U L L I V A N

Boston New York Pittsburgh Cleveland Knoxville St. Louis Dallas Duluth Joplin Denver El Paso Salt Lake San Francisco Spokane



Pioneering again!

Schramm

The new heavyweight Champ

COMBINING all the power and stamina of three husky 120 cu. ft. compressors into *one* efficient, powerful, easily-portable unit. Only one motor to take care of—only one unit to move. This compressor in direct competition with other large makes, has proved its superior efficiency.

If you want power in abundance at maximum pressure; if you want fewer troubles and less expense—get a Schramm Compressor. We have the largest variety of standard models—one of which will prove just right for you. We show (above) the largest and smallest portable jobs. Compare them! Let us send you the data and prices.

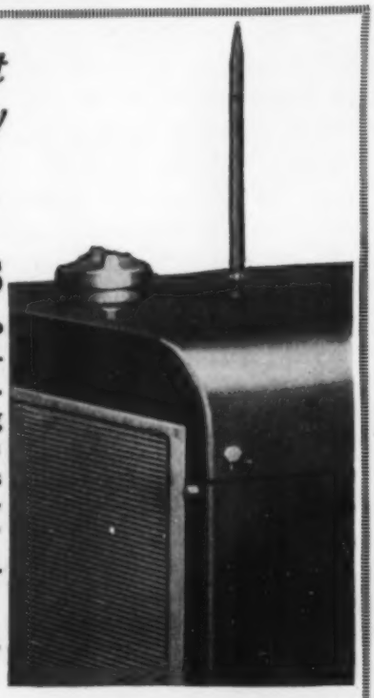
Schramm Inc., Manufacturers

West Chester, Penna.

Representatives and Branches in all important cities

Here's what we mean by

vibrationless



This 2-cylinder Novo Rollr Engine is running at 1800 r. p. m. The pencil standing on top remains *motionless.* That's what we mean by *"Vibrationless."* Send today for complete details.

NOVO ENGINE CO.

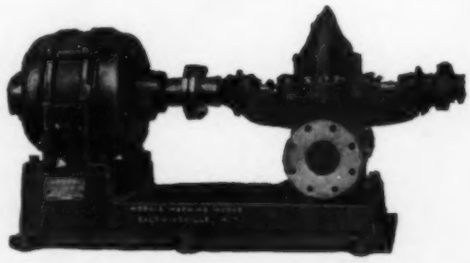
214 Porter Street
LANSING, MICHIGAN

NOVO THE NEW NOVO ROLLR ENGINES

Clarence E. Bement — Vice-Pres. & Gen. Mgr.

MORRIS

CENTRIFUGAL PUMPS



MORRIS PUMPS are made in all desirable types and sizes, motor, steam or gasoline engine, belt or chain drive, for domestic water supply, boiler feeding, circulating, irrigating, drainage, sewage disposal, hydraulic dredging, sand production and conveying, handling clean, dirty or acid water, etc.

Many popular types and sizes constantly in stock, and special designs built for unusual head, speed or capacity conditions. The advice of our Engineers on any pumping problems is free for the asking. Write at least for literature.

MORRIS MACHINE WORKS, Baldwinsville, N. Y.

Originators of Centrifugal Pumps, both Single and Multi-Stage, and builders for practically all purposes since 1864.

Branch Offices:—New York, 26 Cortlandt Street; Philadelphia, Witherspoon Building; Cleveland, 1367 E. Sixth St.; Chicago, 217 N. Jefferson Street; Boston, 79 Milk Street; Pittsburgh, 320 Second Avenue; Detroit, 730 Fisher Bldg.; Charlotte, Realty Bldg.

Sales Representatives:—Buffalo, Kansas City, Omaha, Huntington, W. Va., Houston, and in other industrial centers.

Canada: Storey Pump & Equipment Co., Toronto.

The Lowest Priced 1-Yard Machine on the Market

High quality does not always mean high price. In fact *the American Gopher Shovel-Crane is the lowest priced 1-yard machine on the market*—and a blind man can easily distinguish the remarkable advantages in construction and operation.

It has fewer parts. There is less maintenance for the operator to handle—less operating time lost.

You get a shovel-crane built of all-steel—with such wear and breakage-defeating advantages as oversized shafts of chrome steel, chrome steel crawler treads, a one piece steel revolving frame—and every casting is annealed.

To further assure this shovel-crane against the ravages of constant tough usage, SKF Self-Aligning Ball Bearings are used—and the high-pressure lubricating system adds another wear-defeating advantage.

When you compare all the advantages of the *American Gopher* over other machines of the same capacity on the market, check the price. You cannot get more per dollar anywhere, as our new catalog will show. Send for it.

Chicago
Seattle
Pittsburgh
New York
St. Louis
New Orleans
Indianapolis
San Francisco
Birmingham
Detroit
Los Angeles

AMERICAN HOIST & DERRICK COMPANY
71 South Robert Street
ST. PAUL, MINN.

"AMERICAN GOPHER" Shovel-Crane

Bigger Stronger Better *in Every Way*

THAT was the verdict of all who viewed at the Road Show, the latest developments in

ROGERS TRAILERS

GOOSE NECK — HEAVY DUTY

Displaying five heavy duty trailers, including a monster with eight rocking wheels and sixteen tires at the rear, the Company which has for years specialized in heavy duty trailers again proved to be the pioneer in developing new and larger units.

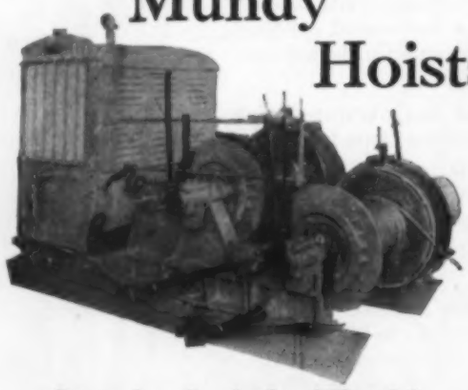
If you have a heavy duty hauling job, regardless of immense size or peculiar character, consult trailer headquarters.

Write for new catalog.

Moving 80-Ton Girders for the Mt. Hope Bridge, R. I.

ROGERS BROTHERS CORPORATION, 106 Orchard St., Albion, Penna.

Mundy Hoists



Standard of the World

Gasoline—Electric—Steam

Built up to a standard
Not down to a price.

Car Pullers—Cableways

J. S. Mundy Hoisting Engine Co.
722 Frelinghuysen Ave., Newark, N. J.

TRADE MARK
MUNDY
ESTABLISHED 1869

Export Office, 30 Church Street, New York City
Cable Address: BROSITES

OK

A Hoist proved in service

O.K. PORTABLE HOIST

PAYS its way day after day, year after year because it does so many jobs well—loading and unloading materials; hoisting supplies; operating scrapers and drags; running portable elevators.

Here are the reasons why so many O.K.'s are in constant use: Heavy engines, powerful brakes and asbestos lined double friction clutches! A fit companion for O.K. Air Compressors and O.K. Portable Elevators.

We have a profitable proposition for live-wire agents. Write.

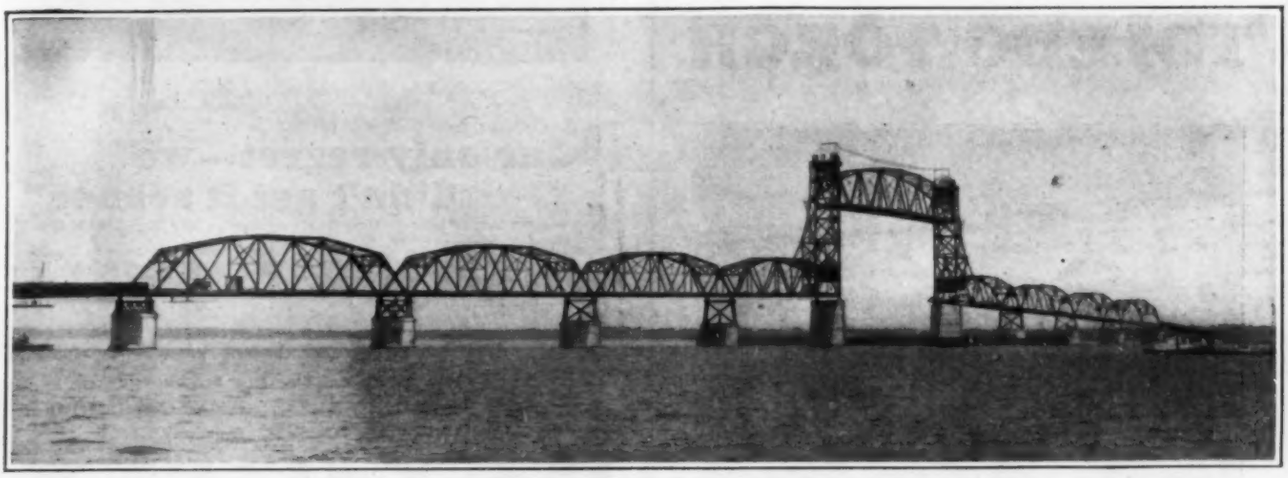
O.K. AIR COMPRESSORS
O.K. PORTABLE ELEVATORS

O. K. Clutch and Machine Co.
P. O. Box 305, COLUMBIA, PENNA.

LAMBERT

HELPS MAKE ANOTHER RECORD

This Time It's on The **JAMES RIVER BRIDGE JOB**



Two Big LAMBERT Gasoline Hoists and Two LAMBERT Derricks Handled the Concrete for the Turner Construction Co.

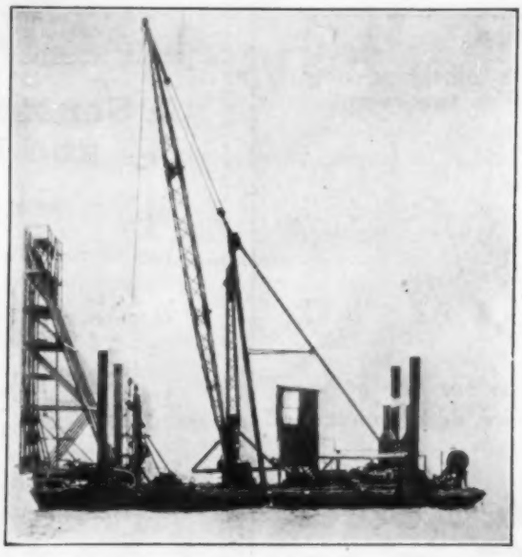
WITHOUT DELAYS—ALWAYS RELIABLE

25-TON LAMBERT DERRICK

Handled the Concrete Piles for Raymond Concrete Pile Co.

LAMBERT
Hoists and Derricks
Must give unusual Service

We Co-operate With Our Customers To The Utmost With Resulting Mutual Satisfaction



HOISTS

ELECTRIC
GASOLINE
STEAM
BELT

DERRICKS

ALL TYPES
TIMBER
STEEL

CRANES

REVOLVING
TRAVELING
STATIONARY

LAMBERT HOISTING ENGINE COMPANY

117 POINIER ST. *Main Office and Works* **NEWARK, N. J.**

! CAUTION !

SAY IT WITH THE
BRIGHT FLASHING

YELLOW

FLAME OF THE

TOLEDO TORCH

Illustrating "The Leader"

Do your safety lights say **"STOP"**

When they should say **"CAUTION"**

THE TOLEDO TORCH protects your construction work and prevents accidents with a signal different from all others on the road. Conspicuous, illuminating and universally understood, it accomplishes safe regulation of traffic, without the confusion and uncertainty of old-fashioned means.

Always on the job. No globes to become sooty or broken. Never stolen. The most economical safety light you can use.

THE TOLEDO TORCH
RIGHTS ITSELF FROM ANY POSITION

Write us or ask your dealer for one of the new booklets describing late developments.

The
Toledo Pressed Steel
Company
Toledo, Ohio

Bay City Tractor Shovel loading blasted stone at quarry of D. B. Trowbridge, Inc., Contractors, Middletown, N. Y. (Member—A. G. C. of A.)

A Contractor says:

"Our only regret—we didn't get it sooner"

About two months after this contractor purchased a Bay City Tractor Shovel he made the above statement in a letter to us.

He was engaged in road work and was using several big shovels on the job. He even replaced one of his big shovels in the stone quarry shown above, with the Bay City for two or three weeks to load stone for the crusher.

The Bay City was also used as a pick-up and clean-up shovel behind the larger shovels, and for trimming slopes and ditches, saving about 10 hand laborers a day.

The sum and substance of this contractor's experience was that the Bay City is the best investment he ever made in road building equipment. He doesn't see how any road contractor can get along without it—and he now wishes he had bought it a year ago, when he first started his contract.

Think this over....and then write for Bulletin T-5

BAY CITY DREDGE WORKS, Bay City, Michigan
New York Office, 302 Broadway

BAY-CITY

TRACTOR SHOVELS—TRENCHERS—SKIMMERS

A Sensational Performer and Money Saver

THE speed, versatility, rugged construction, big yardage and low cost of the Fundom combination shovel, ditcher and crane, make it a sensational performer and money saver.

It makes small jobs profitable. Fast, full ¾ circle swing, 1/3 yard dipper capacity, 16½ foot radius, gasoline power.

With Trench Hoe attachment for ditching or Boom Extension for clamshell, dragline or crane, the Fundom is an unbeatable three-in-one digging machine.

Get the details and name of nearest dealer. Address—

The Fundom Hoist & Shovel Co.
407 American Bank Building, Lima, Ohio

DODGE BROTHERS

ANNOUNCE

The complete line of Trucks, Buses and Motor Coaches which Dodge Brothers have been manufacturing and selling under the name of Graham Brothers now take the name of their makers—Dodge Brothers.

These Trucks, Buses and Motor Coaches have always been powered by Dodge Brothers engines. For years they have been built of Dodge Brothers parts in Dodge Brothers plants according to Dodge Brothers standards.

These Trucks, Buses and Motor Coaches are sold, as they always have been sold, by Dodge Brothers Dealers everywhere.

For Power, Speed, Safety, Economy, Fine Appearance and Dependability, Dodge Brothers Trucks, Buses and Motor Coaches will continue to merit that high public regard which impels keen businessmen to buy them at a rate of more than a million dollars' worth a week.

DODGE BROTHERS TRUCKS

BUSES AND MOTOR COACHES

"Domestic" Model 164—Two Duty Diaphragm Pump

"Domestic" Model 164 Open Spout Diaphragm Pump

"Domestic" Model 164 Diaphragm Pump with Force Discharge Attachment

This pump is so designed that all the best features of former models are incorporated and in addition new features permitting its use as either an Open Spout Discharge Pump or as a Force Discharge Pump as illustrated above.

In five minutes' time this "DOMESTIC" Model 164 Diaphragm Pump can be changed from an Open Spout Discharge Pump to a Force Diaphragm Pump —or the reverse—and the only tool necessary is a monkey-wrench.

When you have to Force the Water away from the job; Force it up over the spoil bank; or due to depth of excavation being too great for a suction lift, it becomes necessary to set the pump in the hole and Force the Water Up—Just attach the fittings and your "DOMESTIC" Model 164 Diaphragm Pump Unit does the trick.

The "DOMESTIC" Model 164 will lift from a deeper trench and deliver more water than any other diaphragm pump we have ever seen.

Write us for descriptive Bulletins.

DOMESTIC ENGINE & PUMP CO., *Manufacturers,* Shippensburg, Pa.

CM-2-29

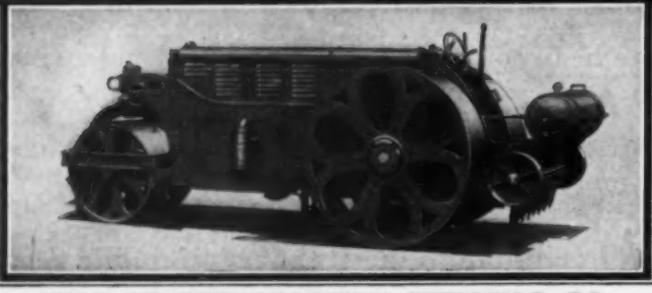
HUBER

4 CYLINDER MOTOR ROLLERS

POWERFUL AND DEPENDABLE

QUICK IN ACTION

ECONOMICAL TO OPERATE



MADE IN FOUR SIZES

5—7—10—12 TONS

SEND FOR HUBER ROLLER CATALOG

315 E. CENTER ST. THE HUBER MANUFACTURING CO. MARION, OHIO

HUMDINGER PUMPS

Non-clogging, everlasting rubber ball valves, totally enclosed, running-in-oil jacks, bronze bushed bearings, all steel trucks, and enclosed engine crank cases make HUMDINGER PUMPS.

THE CONTRACTOR'S CHOICE

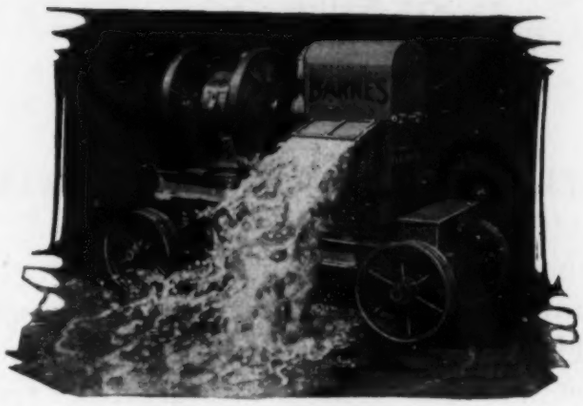
Full detail description given in Bulletin No. 1034 CM. Send for a copy.

RALPH B. CARTER CO., 126 Chambers St., New York

Factory: Hackensack, N. J.

for EFFICIENT
Economical Drainage

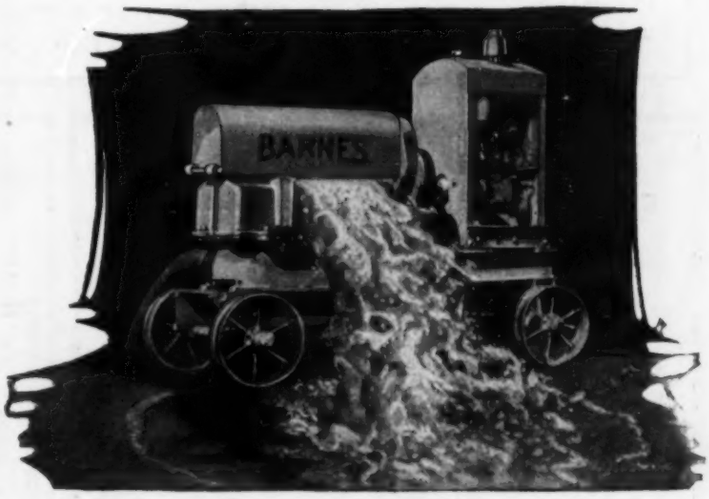
You can't judge a pump entirely by its rated capacity. It's the ability to give service that counts! Barnes single and duplex diaphragm pumps knuckle down to work and pump out more water per dollar than you would think possible. Barnes pumps keep excavations dry—they save time and money for contractors.



The Barnes Single Diaphragm

These Features Are Standard On All Barnes Pumps!

1. All bearings protected from dust and dirt.
2. Smallest number of working parts.
3. Cut steel gears.
4. Dust-proof, oil-tight gear case.
5. Forged steel crankshaft.
6. Replaceable bronze bearings.
7. Accessible suction valve.
8. Quick replaceable diaphragm.
9. Low center of gravity.
10. Maximum suction lift.
11. Capacity single pump 10 to 12,000 g.p.h.
12. Capacity duplex pump 20 to 24,000 g.p.h.



The Barnes Duplex Diaphragm

THE BARNES MANUFACTURING CO.
923 Main St., Mansfield, Ohio

BARNES PUMPS

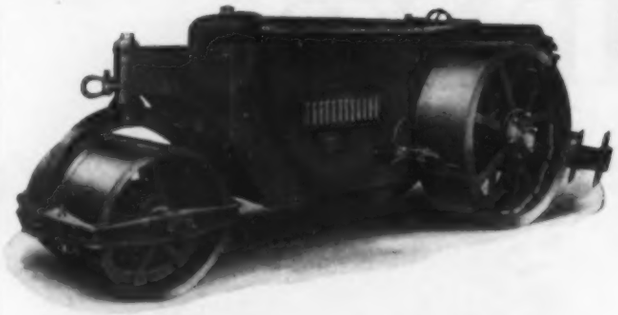
Mail This Coupon Today for Complete Information

The Barnes Manufacturing Company,
923 Main Street, Mansfield, Ohio.
Please send me complete information about Barnes Drainage Pumps.

Name .....

Address .....

City ..... State .....



AMES 6 CYLINDER, 10-TON ROLLER

It Was The Only Roller

EXHIBITED AT

THE ROAD SHOW

USING A

6 Cylinder Motor

"It costs a little more but it's worth double"

THE AMES 6 CYLINDER ROAD ROLLER is designed to be "THE MOTOR ROLLER SUPREME." Built in 5, 7 and 10-ton sizes, has the most pleasing lines yet so constructed as to make it the most rugged of motor rollers. The 10-ton size illustrated above is powered by a 6-cylinder 60-hp. Hercules motor. Has completely enclosed transmission with built-in differential. Has three speeds forward or reverse. Compressed air operated scarifier, full width of rear rolls.

Many other features of interest to owners as well as operators.

Built By

AMES IRON WORKS DIV.

PIERCE, BUTLER & PIERCE MFG. CORP.

OSWEGO, N. Y.

Write Us For Descriptive Bulletin

For the man who borrows *your* copy of "Construction Methods"

We all know him. He doesn't mean to bother you. He really means it when he says he'll return your copy.

But you know that, for some reason or other, he seldom does.

Give this man the coupon - - - ,

Tell him for $1, he can get his *own* copy each month for the next two years.

Construction Methods, Tenth Ave. at 36th St., New York, N.Y.

ENCLOSED FIND ONE DOLLAR
ENTER MY 2-YEAR SUBSCRIPTION TO CONSTRUCTION METHODS

Name .....

Address .....

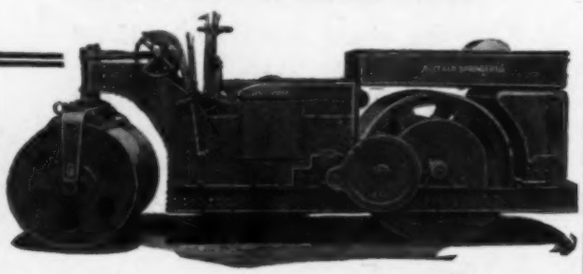
City ..... State .....

Company Employed by or Business Connection .....

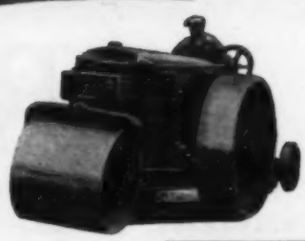
.....

Nature of Business ..... Title .....

There are Always Sound Reasons



for Buffalo-Springfield Supremacy



Which reasons are to be found in the many years of specialized experience back of the men who design and build them—in the up-to-dateness of design of the various models—and in their adaptability to road construction requirements.

Steam and motor driven rollers in all practical sizes. Scarifiers and other special attachments optional.

Write for illustrated booklet describing the Buffalo-Springfield line.

The Buffalo-Springfield Roller Co.
Springfield, Ohio

Buffalo-Springfield ROAD ROLLERS

Champion Hi-Speed Belting

Champion Hi-Speed Belting has strength—flexibility and long life. Special construction and special materials have resulted in a belting for difficult work such as only a real champion can do.

Ask for a sample of

CHAMPION HI-SPEED
The Super Service Belt

TWO points are noteworthy regarding the product shown above. First—It's the result of highly skilled craftsmanship, wide awake research, the best obtainable materials, and, a firm desire to produce something way above the ordinary from a service giving standpoint.

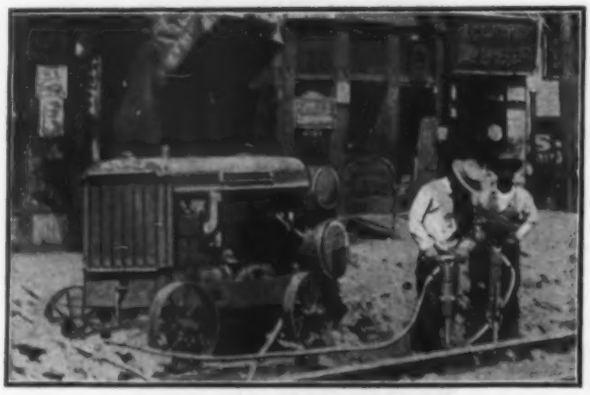
Second—In order that users may be properly served at the lowest possible prices it is marketed in the most direct and economical way — through Industrial Supply Distributors. *Specify* REPUBLIC.

THE REPUBLIC RUBBER CO.
Youngstown, Ohio

Belting - Packing - Hose
Molded Goods - Lathe Cut Goods

REPUBLIC means the Best Mechanical Rubber Goods

Let Us Put a C6 Through Its Paces



Operating two Cleveland C-6 Paving Breakers from a 100-ft. compressor on a street railway job

MERIT is usually best proved in actual competition. We like to put Cleveland C-6 Paving Breakers into competitive tests. And no wonder—

For in nearly all cases—on the same air consumption—they demonstrate their ability to do more work. As much as 35% more work in many cases.

Any tool that effects a cost saving of 75% over hand methods must be good. The C-6 does it regularly. That's why we welcome competition.

Let us put a C-6 through its paces for *you*. Write—

The Cleveland Rock Drill Co.
3734 E. 78th St., Cleveland, Ohio

Complete specifications of Cleveland Drills, pages 150-151 Keystone Metal Quarry Catalog

CLEVELAND ROCK DRILLS

M&M CLAMPS
for concrete forms

No special tools required

Perfect and positive adjustment

Save Labor by Using M & M

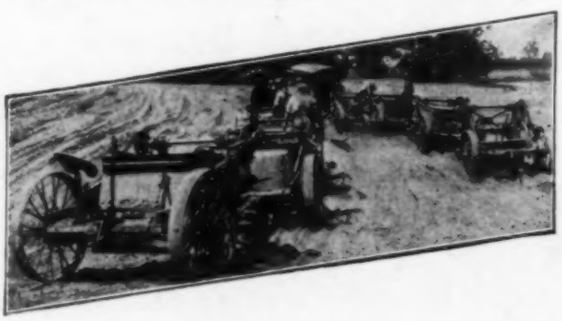
Wire Clamps
Splicing Clamps
Column Clamps
Tie Rod Clamps

Adjustable Shores
Timber Shores
Screed Gauges
Wire Cutters and Nippers

Send for complete information and catalog

M & M CLAMP CO.
No. 2 S.E. Fifth St., Minneapolis, Minnesota

Earth Moving Made Easy



If you want your grading job simplified, adopt the original scraper-train method. Not over two scraper men are needed on trains of two to six scrapers. Two trains can work side by side in narrow cuts without interference. The whole job works like a clock. Your payroll shrinks—your yardage grows.

Three sizes—¾, 1, and 1¼ yards.

Write for Baker Maney Scraper catalog.

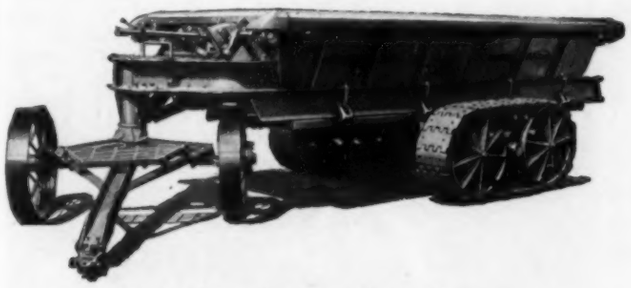
The Baker Manufacturing Company
568 Stanford Avenue, Springfield, Illinois

BAKER MANEY
Self Loading Scrapers

Western 5-yard Crawler Dump Wagon with direct tractor hitch

A Complete Line of Crawler Wagons

Western 10-yard Crawler Dump Wagon



Western 7-yard Crawler Dump Wagon

Western Crawler Dump Wagons are now made in sizes to answer every haulage problem. The latest additions are a 5-yard wagon and a 7-yard wagon with direct tractor hitch. In all, there are 6 styles and sizes:

1. 7-yard with front running gear and 10-ton Athey Truss Wheels.
2. 7-yard with front running gear and 15-ton Athey Truss Wheels.
3. 10-yard with front running gear and 15-ton Athey Truss Wheels.
4. 5-yard with direct hitch and 10-ton Athey Truss Wheels.
5. 7-yard with direct hitch and 10-ton Athey Truss Wheels.
6. 7-yard with direct hitch and 15-ton Athey Truss Wheels.

For more than two years, Western Crawler Dump Wagons have demonstrated their ability to operate in sand, in mud, and over rough ground. The utility of the Crawler wagon needs no further explanations. Your problem is to get the right sized wagon for your requirements.

A complete description of the entire line is contained in Bulletin 29-AD. Write for a copy.

Western Wheeled Scraper Company
Aurora, Illinois

WESTERN

Western

DUMP CARS AND GRADING EQUIPMENT

No Cold Weather Delays on This Job—Thanks to "ANTI-HYDRO"

Much of the concrete and masonry work on this building was completed during the cold weather. "ANTI-HYDRO" was used in the concrete foundations and floors to insure quick setting and to prevent freezing.

"ANTI-HYDRO" lowers the freezing point of cement mixtures to 15 degrees F. Enables you to work practically all winter and finish on schedule time.

By avoiding shut-downs, you keep your organization together all winter and collect prompt payments for completed contracts.

"ANTI-HYDRO" also makes concrete and cement mortar permanently hard and waterproof in one operation. Prevents efflorescence stains coming from the mortar and saves time and money. It is easy to use. Mixes readily with water without the aid of skilled labor.

Twenty-four years of successful results make "ANTI-HYDRO" absolutely dependable. Satisfactory results are guaranteed. Use "ANTI-HYDRO" on your next job.

ANTI-HYDRO
FOR PERMANENT CONCRETE
HARDENS WATERPROOFS

ANTI-HYDRO WATERPROOFING Co.

265-295 Badger Ave. Newark, N. J.

HENDRICK HUDSON GARAGE
TROY, N.Y.

G. S. THOMPSON ARCHT.
CHAS. F. CROWLEY CO., Inc. CONTR.

Get this Price List!

—and make the *saving*, in 1929

Drawing and Tracing Papers.

Sun Print Papers and Equipment.

Drawing Instruments and Materials.

Surveying Instruments, Accessories, etc.

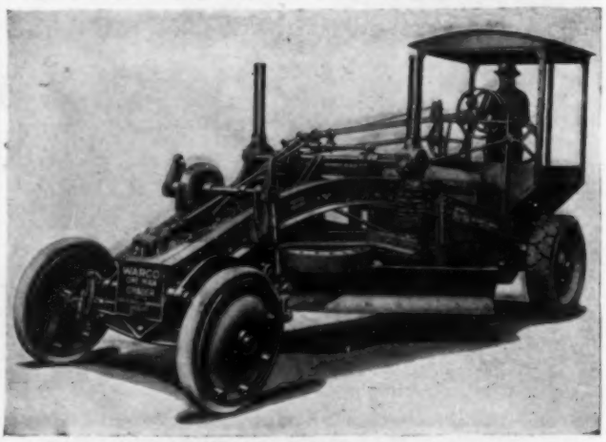
More than 1500 Items are listed, and at the lowest possible prices.

We invite your Inquiry

KOLESCH & CO.
138 Fulton Street
New York City

KOLESCH & CO., 138 Fulton St., New York City.
Kindly send me a copy of your 1929 Price List.
Name .....
Company .....
Address .....

NEW 1929 WARCO ONE MAN GRADER



FAMOUS OVER NIGHT . . . *and justly so*

The W. A. Riddell Company's exhibit at the Road Show — the new improved one man Grader — the new rear crawlers — the new 1929 Almatrac, prompted enthusiastic expressions of commendation on all sides.

This unprecedented reception is a forerunner of the inevitable success of these machines. Their popularity is assured.

The new 1929 Warco one man Grader with newly designed circle and new screw lift (patent applied for) has many excellent features which place it far ahead of any other Power Grader. Subjected to strenuous tests under every possible condition the Grader has proved its worth. Six months ago it was ready for production. In order to be able to introduce a new one man Grader which would be the acme of perfection the machine has been withheld from the market until its perfection was an absolute certainty.

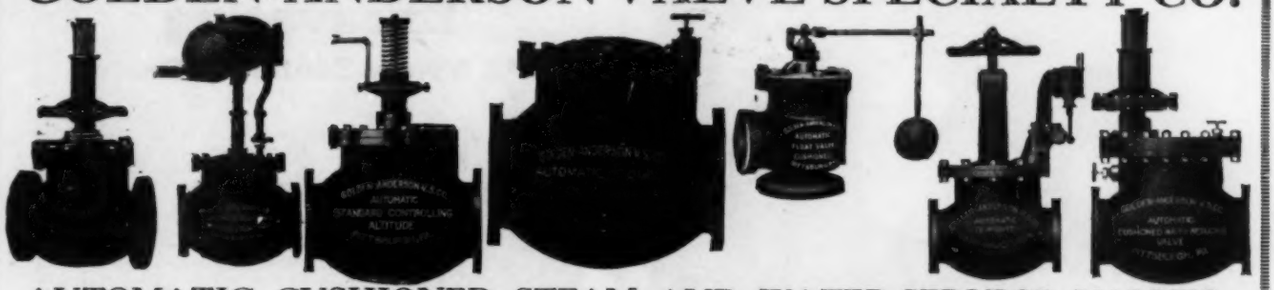
The new 1929 Warco one man Grader is now under production—it will be available for spring delivery—complete specifications and prices furnished on request.

See us at the Southwest Road Show and School, Wichita, Kansas, Feb. 26th-March 1st, 1929, Space No. 109 and 113.

"Warco Products Do the Job—Easily . . . Quickly . . . Efficiently"

W. A. RIDDELL COMPANY
Bucyrus, Ohio Dept. M U. S. A.

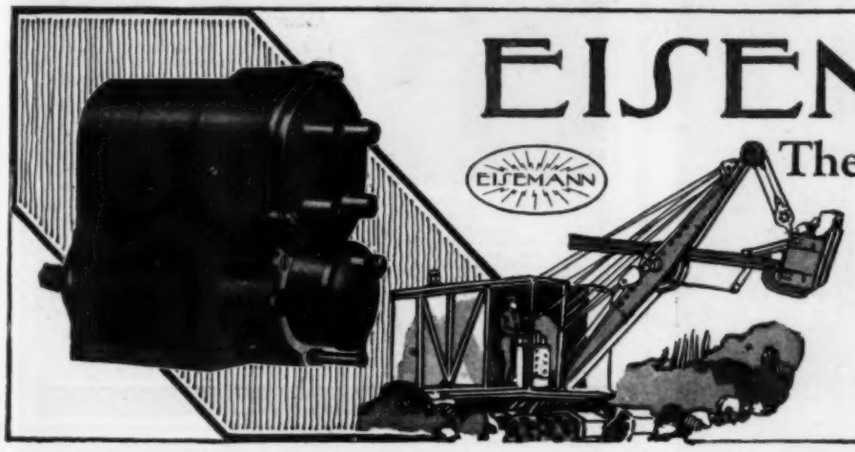
GOLDEN-ANDERSON VALVE SPECIALTY CO.



AUTOMATIC CUSHIONED STEAM AND WATER-SERVICE VALVES

"We Challenge to Test for Merits Any Automatic Steam or Water-Service Valves in the World"

1330 Fulton Bldg. PITTSBURGH, PA.



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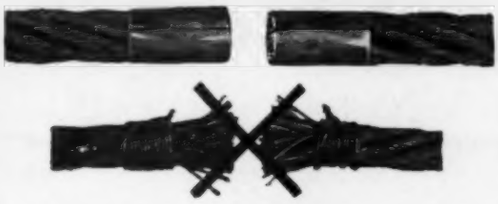

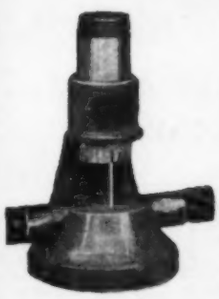

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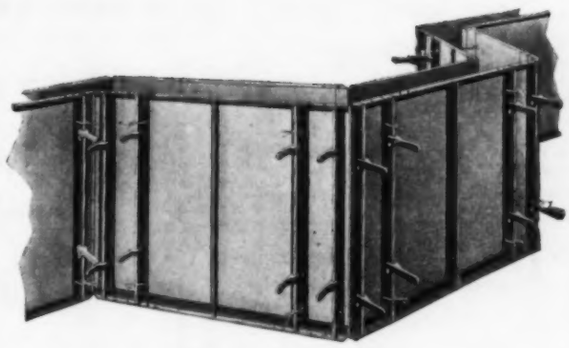

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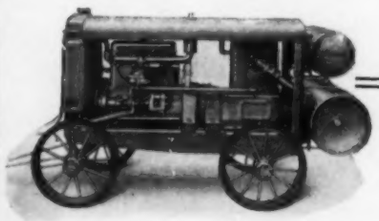

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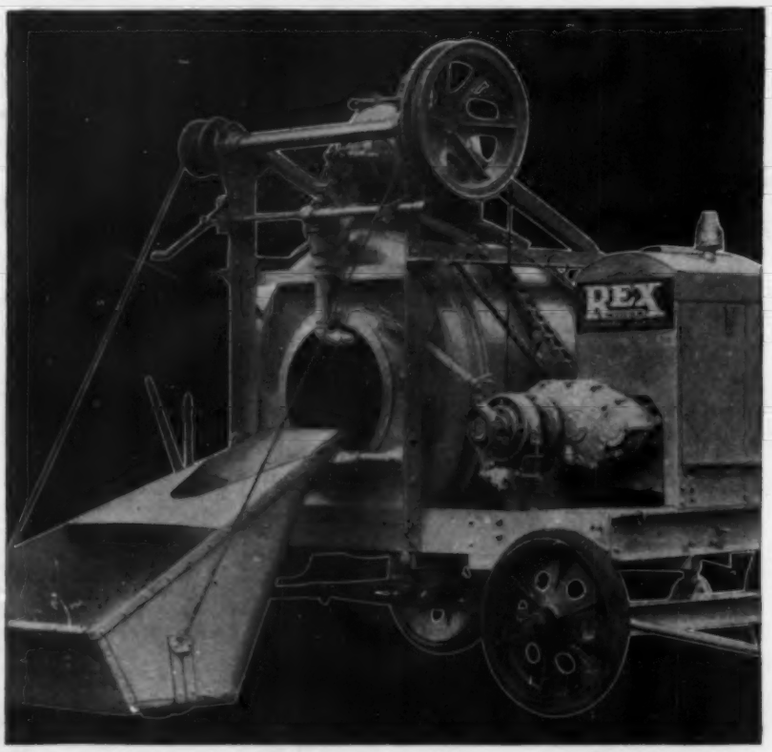

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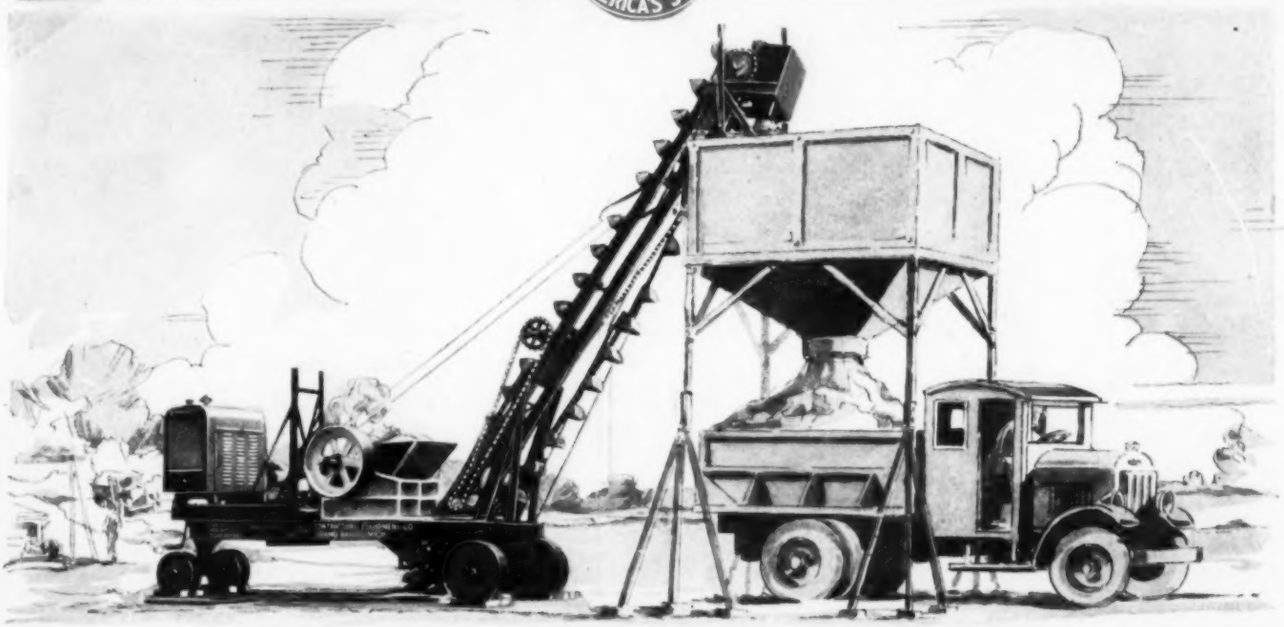

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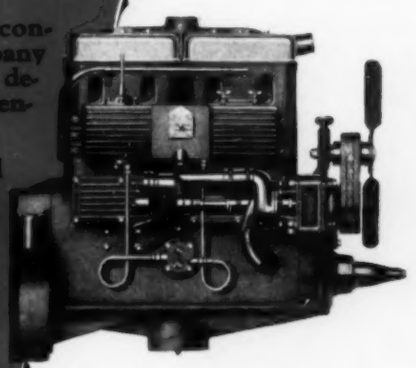

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